SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVIII.--No. 5. [NEW SERIES.] NEW YORK, FEBRUARY 1, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Cotton and Hay Presses.

Some screw presses are so constructed that the operating arms, being fixed to the screw, rise and fall as the press is worked. This is a serious objection, as the operating power, whether men or horses, must be adapted to this change of level.

The engravings present views of a simple press adapted for cotton, hay, or other fibrous products requiring compression or baling. One of the engravings represents the press as adapted to man power, and the other as arranged for horse power, the change being effected simply by an inversion of the apparatus. This change can be effected in a few minutes. The platform sustaining the press is used, whether the machine is operated by hand, or by animal power. Its construction is evident from the engravings. It may be made in sections, so as to allow of being taken to pieces either for facility in transportation when desirable, or for changing the machine from a hand apparatus to one worked by animal power. The posts of the frame supporting the platform may be of wrought iron, connected together by cross beams, and properly braced. A floor may be fixed to the lower cross beams, when the apparatus is to be operated by manual power, and on this floor the packing tube or press may rest.

A strong beam passes across the operating end of the box, or packer, and to this is attached a yoke or arch of iron, or other metal, which sustains the nut of the screw, the friction disk, and the hub of the operating arms. The screw passes through the beam and the rings. Inside the metallic yoke is a cup disk surrounding the screw, and holding between it and the yoke a number of balls, intended to reduce friction. On the other side of the yoke is the double hub for receiving the operating arms. This hub is made in two parts, the disks being bolted together. Inside this hub is the nut for the screw. On that end of the screw which works in the compressing box is a piston which fits loosely the box and compresses the cotton or hay, its surface, as also that of the receiving end of the box, being scored across for the reception of the bands for securing the bale. That portion of the compressor furthest from the arms has the sides of the box removable for the reception of the material to be pressed.

This machine is simple in construction, easy in operation, and presents the advantage of being driven either by hand or by horse power. Patented through the Scientific American Patent Agency, Sept. 3d, 1867, by J. S. Schofield, Macon, Ga.

The rights for all States except Georgia are for sale by the patentee.

Fig. 1

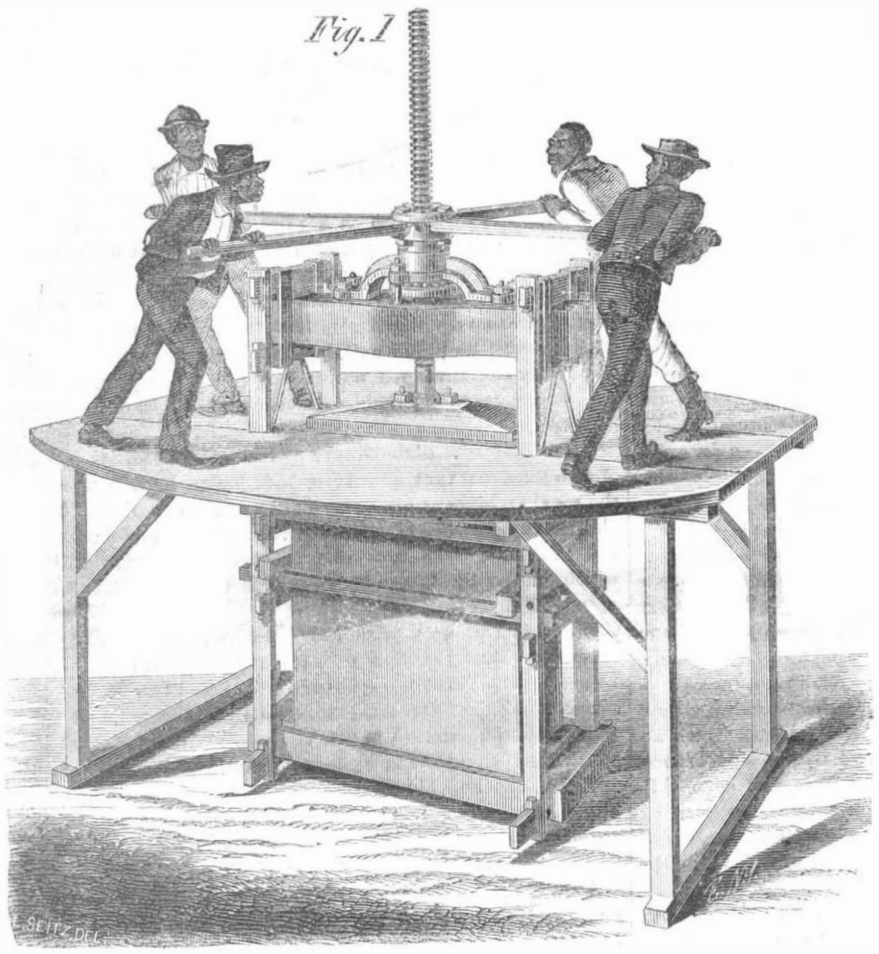
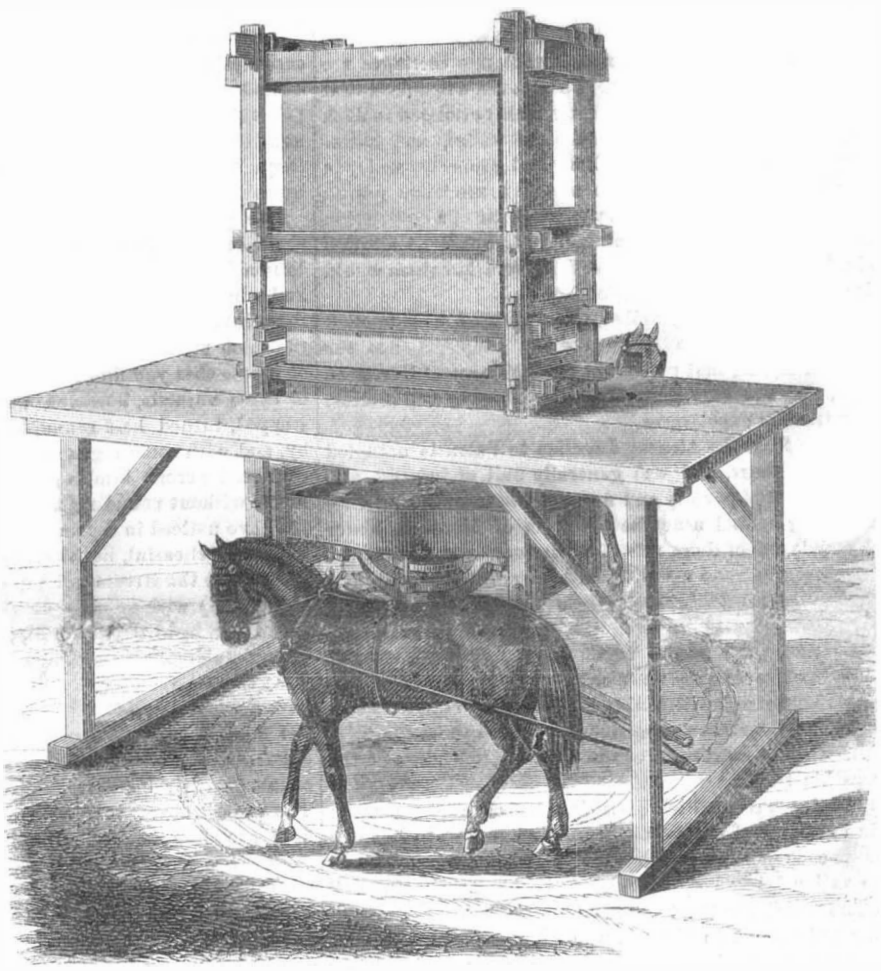


Fig. 2



SCHOFIELD'S PATENT COTTON PRESS.

Silvering Glass Mirrors.

The process we propose to describe has for its author Prof. Henry Draper, of this city, and may be divided into five operations, viz., the cleaning of the glass, the preparation of the silvering solution, the warming of the glass, the process of silvering, and the polishing. The description is for a 15½ inch mirror.

1. Rub the glass plate thoroughly with aquafortis, and then wash it with plenty of water and set it on edge on filtering paper to dry; then cover it with a mixture of alcohol and prepared chalk and rub it in succession with cotton flannel.

2. Dissolve 560 grains of Rochelle salt (tartrate of soda and potassa) in 2 or 3 ounces of water and filter; dissolve 800 grains of nitrate of silver in 4 ounces of water. Take an ounce of strong ammonia of commerce and add nitrate solution to it until a brown precipitate remains undissolved. Then add more ammonia and again nitrate of silver solution. This alternate addition is to be carefully continued until the silver solution is exhausted, when some of the brown precipitate should remain in suspension. Filter. Just before using, mix the Rochelle salt and add water enough to make 22 ounces. The vessel in which the silvering is to be performed should be a circular dish of ordinary tin plate and coated with a mixture of equal parts of beeswax and rosin. At opposite ends of one diameter two narrow pieces of wood are cemented to keep the face of the mirror from the bottom of the vessel.

3. The glass is slightly warmed by putting it in a tub or other suitable vessel and pouring in tepid water to cover the glass; then hot water is gradually stirred in.

4. Carry the glass in the silvering vessel, into which the silvering solution has been poured, place the whole apparatus before the window and keep up a slow rocking motion. Leave the mirror 20 minutes in the liquid or half an hour, and wash with plenty of water.

5. When the mirror is perfectly dry, take a piece of the softest buckskin, stuff it with cotton, and go gently over the whole silver surface to condense the silver. You may use some of the finest rouge. The best stroke is a motion in small circles; rub an hour. The thickness of the silver thus obtained is about $\frac{1}{200000}$ of an inch.

Vegetable Soap.

There are certain plants distributed all over the world yielding a saponaceous juice which, to those who are desirous of having a white, delicate skin, must be far preferable to the finest "ambrosial," "milleflower," or "basket of fruit" soap. No doubt the ancients used such plants instead of soap; perhaps they were the same still used for the like purpose in Italy and other neighboring countries. Pliny, in giving the description of one of them, says:—"It grows on a rocky soil and on the mountains, and its leaves are prickly like those of the thistle." If this is the *gypsophila struthium* of Linnée, a plant still used for washing in the southern parts of Italy and Spain, and for which the description corresponds remarkably well, we must leave the botanists to decide. Suffice to say that besides this, the soap root of Europe, the aloe of Jamaica, the soap tree from the coast of Coromandel, and the horse chestnut, yield said juice, some by their leaves, others by their roots. Its peculiar principle—as chemtry teaches us—is the saponin, a body belonging to that class of organic substances which, upon being treated with certain acids or alkalies, yield glucose or starch sugar among their products of decomposition. The saponin is in its pure state a white solid, of a sweet but acrid aftertaste, it leaves, when spread over a plate, a fine looking varnish, but the most peculiar property is the viscosity of its solutions; when they contain camphor or resin, they will bear the heavy mercury.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

EDITORIAL CORRESPONDENCE.

Annoyances of Spanish Travel—Valencia, Its Huerta, People, Curious Sights—Old Tarragona by Moonlight—Ancient Churches—Barcelona, etc.

MARSEILLES, Dec. 31, 1867.

A trip from Northern Spain may not inaptly be compared to entering a large animal trap. It is quite easy to get in but it is not so easy to get out unless the tourist is content to do nearly the whole thing over again. From Bayonne to the Mediterranean stops can be made at several stupid but interesting places, which break up the monotony of the trip; but there are no completed lines of railway along the sea, therefore the choice lies between poor coasting steamers or a return over the railway as far back as the junction at Alcazar, a station a few hours south from Madrid where another line branches off to Carthagena, Alcante, and Valencia

We left Malaga for Valencia at six in the morning, and returned to Cordova where we took another train northward to the Alcazar Junction which we reached at two hours past midnight—nearly an hour behind time. Here we found the Valencia train in waiting, and as it was necessary to purchase tickets and get our luggage weighed and changed there was no time to be lost, and what added to the peril of our situation the agent refused to take French gold, the first instance of the kind we have met since we commenced our travels on the continent in June last. What were we to do in such a dilemma? We had not quite money enough to pay our baggage and buy our tickets to Valencia. It was cold midnight; no bankers, no hotels, no nothing except Spanish insolence accompanied by a downright refusal to take some forty francs

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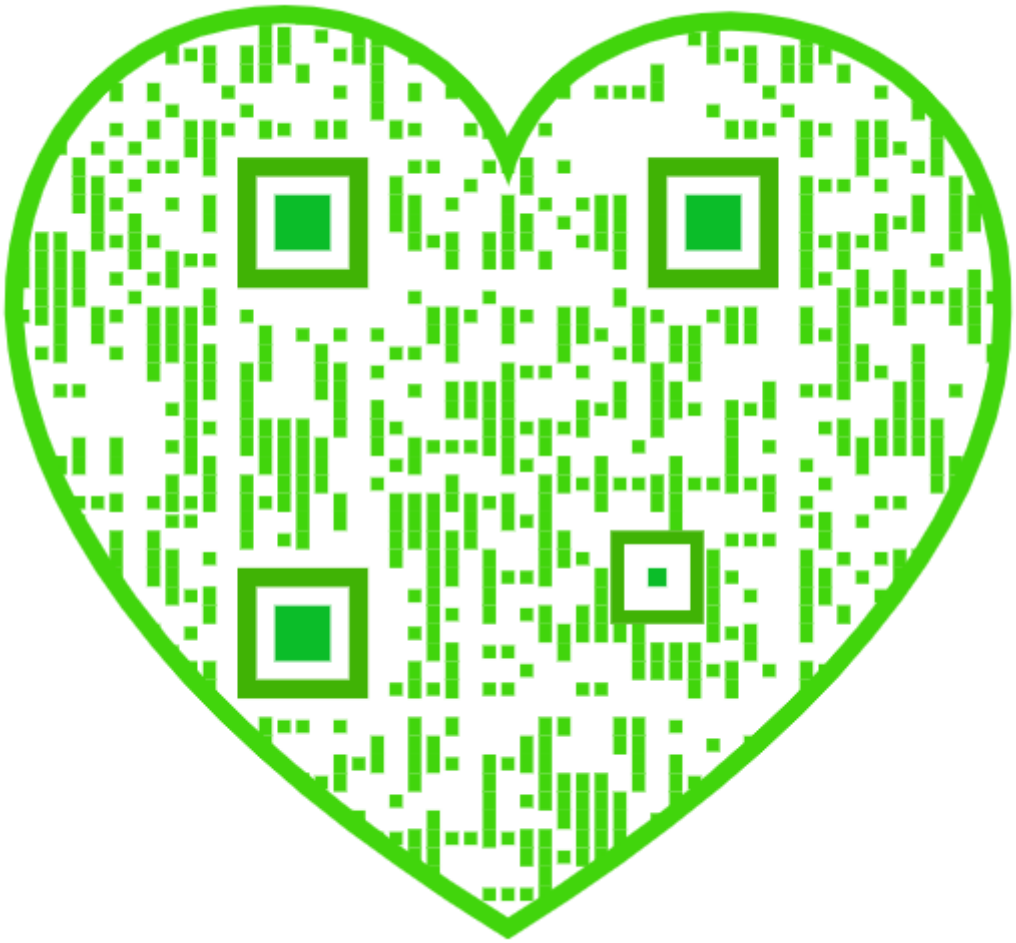

in gold simply because it chanced to have been coined in Paris instead of Madrid. Very fortunately for us a Frenchman standing near saw the fix we were in and true to his native instincts he relieved our situation by exchanging money which enabled us to pursue our journey as comfortably as we could on a cold, windy night in a slow Spanish train. But for this providential interposition there is no knowing exactly how we should have contrived to stop long at Alcazar or to have got away from that desolate place. The rural hotels in Spain are not intended to accommodate any body and nothing seems to surprise the proprietor more than to have a foreigner apply for lodging. The houses have no fireplaces, but warmth is supplied by the use of an old-fashioned brazier, which resembles a huge warming pan, into which burning charcoal and ashes are placed. Between the horrid diet and the fumes of the brazier if the guest succeeds in escaping with his life he may consider himself a special favorite of a kind Providence.

The railways in Spain are usually very expensive works as owing to the mountainous character of the country there is much deep cutting, tunneling, and heavy grading. The cars are divided into three classes, very similar, though generally much inferior to the French. The first-class cars are supplied with cylindrical-shaped vessels, covered with carpet and filled with hot water, which serve the most excellent purpose of keeping the feet warm. The cars are usually dirty, a national habit, scrupulously observed. The management of railways in Spain is more slipshod than in any other country, always excepting our own, with this great advantage in favor of Spain. All the highways and most frequented mule paths that cross the track are carefully guarded during the passage of the trains, a precaution not so necessary here as in our own country, for the reason that few carriages are ever seen on the common roads. To tell even a Spaniard that railway trains in the United States are permitted to dash headlong through towns, villages, and cities, and across highways, so regardless of life, limb and property, and you astonish him greatly. One of them said to me "you permit such things in your country and yet you boast of a civilization superior to our own. I do not believe it would be allowed even in Africa. The instincts of self-preservation alone would require some necessary precaution."

Throughout all Europe railway companies are compelled to pay strict attention to the lives of the people, hence the excellent discipline that marks the management of European railways, and the very general feeling of safety and comfort which a traveler experiences.

The route from the Alcazar Junction to Valencia occupied about twelve hours, and was generally dull of interest, and through realms of poverty and apparent barrenness until we passed a long tunnel near the old town of Montesa, above which stands one of those ruined castles once the safe retreat of robber knights who came down like vultures upon their defenceless prey. The scenery now changes to a valley of oriental beauty and exotic vegetation, abounding in orange, mulberry and palm groves which grow in wild luxuriance. The hillsides are terraced up in masonry for the purposes of irrigation and the fertile valley is watered by countless rills and conduits, the same as the Moors arranged them centuries ago, the whole constituting a most skillful application of the hydropathic treatment.

The Water Tribunal of Valencia sits once every week within the porch of the old Cathedral and applies to this day the same code of laws which were introduced by the Moors.

The valley lying back of Valencia is called the "Huerta" and offers one of the most beautiful and glowing pictures of fertility to be found in Europe, the sight of which almost compelled us to overlook all the shortcomings of decripit old Spain.

So far as mere sight seeing is concerned, Valencia cannot detain a traveler very long. It is a thriving city of over one hundred thousand inhabitants, and very cheerfully situated about two miles back from the Mediterranean. There are fewer beggars in the streets than in some other of the large Spanish cities, and as a general thing the people have a better look. They are said to be proud, honest, industrious, revengeful and superstitious, hospitable to strangers, fond of love making, pigeon shooting, cock fighting, and bull tormenting, and of every thing else that leads to fighting and bloodshed.

The Plaza de Toros (Place of Bulls) built in 1850, is probably the finest in Spain. It resembles the Roman Coliseum, and has a very imposing substantial look. There are also some very fine public and private botanical gardens. The markets are well supplied with luscious fruits, nuts, and vegetables, but my experience is that the guests of the hotels do not get very much of the good things to be found in the markets. There is here a large cathedral somewhat barren, however, of intrinsic architectural interest compared with others in Spain, but it contains some singular religious pictures. One of them represents the martyrdom of an old saint whose bowels are being drawn out and wound upon a windlass. In strange contrast to this example of human butchery, which has been practised to perfection in Spain, there is a most exquisite head of the sorrowing Virgin painted by Sassoferrato, an Italian painter, whose style was as soft as the finest velvet. It is said that good artists spend a month's time in endeavoring to produce a copy of this surprising little work of art. The sacristy of the church contains, as Capt. Cuttle would say, the *dietical* cup from which our Saviour drank wine at the Last Supper, and which can be seen for a fee on any afternoon about three o'clock if the gentleman can be found who carries the key. He wears a long black robe with girdle about the waist, low-quartered shoes with silver buckles, head surmounted by a black felt hat, very broad brim, which rolls over at the sides like a layer of birch bark. The cup exhibited is of fine silver, neatly made and genuine, of course, as it is said to resemble the one shown in the great painting of Leonardo da Vinci, at Milan. Seriously, I have no doubt that Christ drank from a cup at the Last Supper with his disciples, and it is barely possible that the identical cup is still in existence, but how these ecclesiastics can attempt to palm off upon enlightened travelers so much nonsense and rubbish without laughing is a mystery to me. We have already seen wood enough of the true (?) cross to build a small dwelling house, and we are not half through yet.

Valencia has also a picture gallery that contains a tolerable collection of paintings chiefly by old Spanish artists, nearly all religious subjects. Those old painters must have been a very pious set of men as all their productions show that they had neither taste nor skill for any other class of subjects. We were advised to visit the Church of the Patriarch, founded two centuries ago by Archbishop Ribera, and to witness a dramatic religious ceremonial enacted every Friday, at which time a series of dissolving views are introduced into the service the church being purposely darkened to add impressiveness to the ceremony. We happened to enter at the wrong time and as we were about to commence to exercise the stranger's privilege to see the sights we were told by the sacristan that we could not go round as some one was praying. There were no worshippers, no attendants upon the ceremony except ourselves and the official, but the voice of a human being, as if in the act of chanting prayer, came forth very musically from a dark alcove near to the high altar. The language was unintelligible to us but it seemed like prayer and we quietly withdrew, without having gratified our curiosity. When we were in Granada we attended the cathedral service in the afternoon. The ceremonial was conducted with great pomp and circumstance by twenty-one priests and assistants. I counted all the worshippers and they numbered but sixteen; but all seemed to be very sincere as frequently during the service I noticed that several of them leaned forward and kissed the pavement of the church.

The peasants of Valencia, who labor under the grateful shade of the palm, orange, and mulberry, dress in wide, brown linen drawers, or kilts, with some sort of leggins, and a handkerchief bound around the head, which makes them look like the Bedouins of the desert. The donkeys are the same meek, quiet, patient, unconcerned, perfect pictures of repose that you find everywhere in Spain. We passed one of these animals, however, the other day, and he actually stopped, turned half round, looked at the train as it passed by, and with some signs of emotion; but his brutal master could not permit him to gratify his curiosity even for a moment, without pounding his head and ears.

I have noticed in Spain that for some reason the women look more cheerful, healthy, and robust than the men. They promenade the streets in long dresses, or "street sweepers," and usually with no other covering for the head than a lace veil, and a light shawl or silk mantle thrown carelessly over their shoulders. The men have a cross, dyspeptic look, and wrap themselves up either in the folds of a cloak or shawl, with a woolen muffler tied about the neck and lower part of the face. They are usually inveterate smokers of strong cigars, or cigarettes made of paper and tobacco, which accounts for their bloodless, haggard, and listless appearance. The use of tobacco is so universal that boys, and even children, are often seen smoking in the streets. They pick up the stumps of cigars and convert them into cigarettes, which are certainly quite as cleanly as those that are made in the government tobacco factories.

The climate and soil of Spain are well suited to the growth of tobacco, but its cultivation is prohibited, as I was informed, chiefly with a view to benefit Cuba. Upwards of sixteen million pounds are smoked and snuffed annually, which affords a good idea of the baleful and subtle influence which has so much impaired the manhood of the Spanish race. Some satirist has said that real progress in Spain will not begin until a decree comes forth prohibiting the use of cloaks, knives, and cigarettes. There are, however, heavier clogs than these which drag down the people of Spain, and it will require several violent earthquakes in the social, moral, and religious element of the country before it can begin to regenerate.

The governing classes are unquestionably proud, haughty, and overbearing, destitute of sound principle, and unfit to rule. The next class are the governed, the honest, industrious, working, priest-ridden people, who are mere hewers of wood and drawers of water to the priests and the aristocracy. There is no middling class, as in France and Prussia, to energize the whole mass, and maintain a happy equilibrium between the legitimate powers of the government and the rights of the people. Spain was always financially poor, the slave of expediency, and never poorer than now; and unless something extraordinary turns up, and that very soon, the government will find it very difficult to control the elements which threaten its ruin.

A railway is now building, and is nearly completed, from Valencia to Barcelona, but about half way between the two cities it is necessary to diligence some three hours. Here we underwent another pressure, as every seat was taken, and no provision is made for persons above the ordinary size. However, we lived through it, but upon arriving at Tarragona we were an hour behind time again, and the Barcelona train had gone off and left us; therefore we had no other alternative but to look for lodgings, which we succeeded in finding in the top story of a hotel, where we found comfortable quarters and a very civil Italian landlord, who devoted himself to making our stay agreeable. We thought at one time that he intended to pay us something for stopping with him; but our minds were disabused on that point the next morning. We were glad, on the whole, of the break, as it enabled us to see by beautiful moonlight one of the oldest cities in Europe —Tarragona—founded by the Phenicians, colonized by the Carthegenians, captured by Scipio, and the birth place, it is said, of Pontius Pilate. The historian says it once contained a million of inhabitants; but most likely this referred to a province, and not to a city merely. There is abundant evidence, however, that it was a city of considerable magnificence under the Roman Emperor Augustus, who used to reside here in winter, as the climate was preferable to Rome. The church of San Pablo is so old that the Tarragonese declare that it was built by the Apostle Paul. The Cathedral is also very ancient. It is not known by whom or when it was built, but it is a lofty, noble building, and possesses a very elaborately decorated front, with niches for statues of the apostles and prophets, some of which have disappeared. Tradition says that at one period these niches were full; but that once in a hundred years one of these worthies, getting tired of the repose of the situation, quietly comes down and walks off. Noticing a procession of lighted candles passing into the cathedral, we followed on, and upon entering found that it was lighted up, and a few worshippers were kneeling around the altars. The lighted candles all vanished through "the long-drawn aisle and fretted vaults," and we were left to wonder and speculate upon its significance. Within these old churches there is often met an incongruous mixture of sacred and profane objects. The cloisters of the cathedral of Tarragona, among other curious things, have sculptures of cock fighting, battles between gladiators, and a very curious one that represents some mice solemnly bearing to the grave the remains of a cat, who pretends to be dead; but upon reaching the sepulchre puss throws off her incognito and is up and after her mourning friends, who fly in every direction before the ghastly form.

The road between Valencia and Barcelona passes through a very barren country, and for much of the distance in sight of the blue Mediterranean. The olive tree seems to be the chief dependence of the people in this section. It grows abundantly throughout all Southern Spain, and is much used as a substitute for butter and grease. The people make a dish called *migas*, which is a mixture of crumbs of bread fried in oil, salt and pepper. They also eat bread soaked in oil. Aliens do not usually hanker after these preparations.

Barcelona is the most interprising city in Spain. Its manufactures are very extensive; its excellent harbor is filled with vessels; its public buildings are large and usually fine; its streets are thronged with a busy, bustling people, and everywhere there are visible evidences that it is a city of progress.

It was here that Blasco de Garey launched his steam vessel of two hundred tuns, Jan. 17th, 1543. The records now in the royal archives at Simancas state that the experiment took place in the presence of a committee appointed by Charles V. and Philip II. The invention consisted of a large boiler, which moved by steam two wheels placed at the sides of the vessel. The experiment was a success, but for some reason the king's treasurer, who had conceived a personal spite against the inventor, drew up a report to his royal master, in which he stated that the speed did not exceed two leagues in three hours; that the machinery was complicated, and the boiler liable to burst. Charles V. was so much involved in political schemes that he could not examine the matter with any care, but he paid De Garey all his expenses, and made him a handsome present of money, when the whole thing ended, and the secret, whatever it was, died with the inventor. So runs the narrative.

A short ride of three hours by cars, brought us to Gerona, a strongly fortified place, which some wag has said belongs to Spain in time of peace, and to France in time of war. Here we were booked for a ten-hours diligence ride.

At the frontier, the Spanish official gruffly demanded our passports. Not supposing that they would be required, we had them locked up in our trunks. The conductor of the diligence assured the officer that we were Americans, not Catalonian revolutionists, and as it would make a good deal of trouble to unload the baggage, he hoped we might be permitted to pass on. After some parleying and growling, we were permitted to go on, soon to reach the French frontier and French civility. The officer approached us, touched his hat, and said, "Pardon, monsieur Have you passports?" We replied, "Yes; they are in our trunks." "Excuse me," he said, "of what country are you?" Our answer satisfied him, and we were civilly permitted to proceed, and happy to feel ourselves once more in France, prepared to take a more cheerful view of the condition of bodily life.

Forty days spent in Spain satisfies me that to the artist, the antiquarian, the ecclesiologists, the lover of architecture, and for the mere curiosity-hunter, it is a country of abounding interest. Even its timberless mountains, plains and valleys, and its waterless rivers, are curious to behold; but there is also a loneliness, an absence of homelike feeling, which soon becomes oppressive to those accustomed to the comforts of domestic life in our own country. It is said that even the birds forget their songs in old Spain.

S. H. W.

Aluminum for Mathematical Instruments.

MESSRS. EDITORS: In your issue of Vol. XVIII., page 3, I find an article suggesting the advantage of using aluminum, on account of its lightness, instead of brass or German silver, as material for mathematical and surveying instruments. Being a mathematical instrument maker, and knowing the great discomfort of carrying heavy instruments, I have often reflected upon reducing the weight of our usual instruments without impairing their accuracy and strength, but have never fully satisfied myself how it could be accomplished, as their construction is such that any further reduction of the material would be detrimental to the accuracy.

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I agree with your correspondent of Helena that aluminum will not only fill the place of brass, but will in many respects be superior to it, and that all mathematical instruments should, if not wholly, be at least partially made of this metal, or of a compound containing it. Aluminum has already been used by Messrs. T. Cook & Sons, of York, England, for their astronomical instruments. When I was there last year there were two large transit telescopes in process of construction, of which the heaviest parts were made of a compound of aluminum and copper, in order to reduce the weight of the telescopes (they being about seven feet long by an opening of the object glass of about six inches), there being no counterpoise, which is generally necessary in order to attain accuracy and an easy management. As at the present the cost of aluminum is too great for general use, until we discover a cheaper and more rapid process of extracting this metal, we must content ourselves by using a compound as above mentioned, which reduces the cost greatly and materially lessens the weight. The cost of working this metal will most probably be somewhat greater than that of brass, and as screws require great strength, in proportion to size, they should be made of German silver.

Aluminum has also proved of great advantage as a material for the smaller weights used in chemical analyses, on account of the greater difference in their sizes and consequent ease of handling.

If "Aluminist" desires to correspond on this subject of constructing instruments of this metal, I should be greatly pleased to answer any inquiry. L. BERGER.

Roxbury, Mass.

[It seems as though the attention of our chemists and practical metal workers might be profitably directed to the subject of a cheap and ready means of extracting aluminum. If procured cheaply it could be applied with great profit and advantage to various manufactures. The failures hitherto of compassing this object should not deter the enterprising and persistent inventor.—EDS.

Bessemer Steel Rails--Homogeneousness of Metals.

MESSRS. EDITORS:—Your notice of the London *Engineer's* article on steel rails, or more particularly, the breaking of the steel rails at the Camden and Chalk Farm stations, may possibly, unless explained, have a tendency to mislead such persons as are not acquainted with the properties of the two metals for railroad and other purposes. I am glad to find that you do not agree with the *Engineer* in its opinions of steel rails.

It seems to me that engineers think that it is a matter of impossibility to make inferior pneumatic steel. It is true, it is not so easy to make poor steel rails as it is to make poor iron rails, for we can box up in a pile an inferior material for rolling into iron rails. But with regard to steel rails there is no piling. The ingots are cast to suit the weight of rail or bar. It is true you can by the use of cast iron, contaminated with sulphur, phosphorus, and other destructive elements, produce an inferior quality of steel. You can also produce an inferior quality of steel by not thoroughly decarbonizing your iron, or by the use of an inferior carburizing material. But with the use of suitable materials, a skillful converter, and the Bessemer machinery, you can produce a homogeneous material with more economy and more certainty than by the old process. In fact I doubt very much if any of the commercial iron produced by the old process could be strictly called homogeneous, and you will, I think, admit that it is not so tough as pneumatic steel or iron, Chalk Farm rail notwithstanding.

Then if the iron is not homogeneous it must be heterogeneous, and a heterogeneous metal is a poor one for rails, for it is a law of physics that if two bodies impinging against each other are heterogeneous (or if one of them be so), the result will be electricity, and this electric current has a magnetic action in a direction cutting its own at right angles.

Then, Dufour says the tenacity of iron (homogeneous) is increased by the passage through it of an electric current. Thus, iron wire, 0·009248 m. diameter, which sustained only 2,545 kil., held 2,898 kil. after the action of a current of Bunsen cell during 263 hours. This proves the assertion of Robert Mushet, Esq., that pneumatic steel, in all probability, will gain in toughness by exposure to the atmosphere and to the impact of locomotive wheels, and that the notion of their becoming brittle from the latter cause is a mere phantom of the imagination, in confirmation of which not a single valid argument or proof can be adduced. This is true, and with due respect to the editor of the *Engineer*, my opinion is that Mr. Mushet is a better authority on this subject than he is.

As you say, it is well understood that cold hammering will produce crystallization; but it is not proved that the iron acted on was homogeneous—on the contrary it is more than probable that it was heterogeneous. We have proof that there is no alteration in the molecular structure of homogeneous steel by impact, unless it is that improves its toughness.

When iron is broken with great rapidity there is no time allowed for the exercise of the property of ductility, and the fracture will naturally be crystalline. But if time is given for the metal to exercise this property of ductility the fracture will be fibrous. I have seen the wool drawn over the eyes of inspectors of railroad bars in this way. Take, for instance, two pieces of iron from the same bar, fibrous or otherwise; nick each of them where you want them broken; then bend one of them slowly round a sharp angle, and it will show a fibrous fracture; then let the other be broken short under a monkey, and you will find the fracture highly crystalline. If makers of iron rails who want to get a crystalline head and a fibrous flange from the same kind of iron would take the hint that this idea suggests to them in piling, they would improve the value of their rails very much. But then the day of iron rails is passed; no railroad company that consults its own interest will lay any more iron rails on their lines.

What did the fracture of the broken steel rail that the *Engineer* writes so much about prove? Did it prove it to be uniform in quality, or in other words, did it prove it to be homogeneous? Not at all. Then why, in the name of common sense, condemn steel rails because of the maker's fault? We are aware that some of the makers of iron rails, and especially those that do not feel like going to the expense of putting up pneumatic steel works, will do all they can to impede the progress of the pneumatic process in this country, and probably join issue with such of the English railroad capitalists and free traders as have a large number of puddling furnaces and its machinery in the shape of invested capital, that would of course depreciate in value should the process become more adopted. "Birds of a feather will flock together," as they say; but the day is passed to make a retrograde movement with regard to pneumatic steel in this country. It is all very well for those old fossils who would not read the handwriting on the wall a few years ago, and who have built works for the production of iron rails, to chuckle at this so-called failure of steel rails; but before it can be called a failure let us have some proof of it in such a way that it can be understood.

In view of the late frightful railroad accidents, the public demands that tough, homogeneous steel rails, steel tires, axles, etc., be used in the construction of railroad plant. Alteration of molecular structure by impact is a bugbear—a humbug. Impact improves the tenacity of homogeneous steel rails. And with the aid of this last beautiful invention of Mr. Saxby's of testing iron by magnetism, an imperfect bar can be detected at the mill and of course rejected, so that there need be nothing used but perfectly homogeneous bars, which will increase in toughness the longer they are in use. W. G. JR.

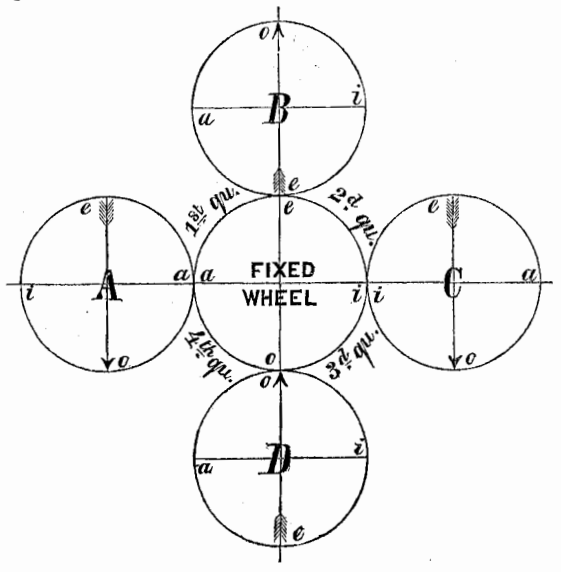
Pottsville, Pa.

Turning a Movable Wheel Around a Fixed Wheel.

MESSRS. H. M. T., Vol. XVI., page 347, inquires:—"How many revolutions, on its own axis, will a wheel make in rolling once around a fixed wheel of same size?" You answer "one."

D. S H., Vol. XVII., page 39 says "two." You dissent, and adhere to "one."

Now, premising the self-evident fact, that two diametrically opposite points on the periphery of a wheel cannot exchange places without a half revolution of the wheel, I think the question will be definitely solved by the showing of this diagram:



A marks the position of the wheel before moving—the opposite points on its periphery being shown by the arrow, now pointing *downward*. Roll the wheel over one quadrant of the fixed wheel, and it takes the position, B, the arrow pointing *upward*. The opposite points have exchanged places, therefore the wheel has made a half revolution. Rolling over the second quadrant brings it to the position, C, the arrow pointing *downward*. Here the points are again reversed, indicating another half-revolution, and the two halves constituting *one* complete revolution in rolling over *half* of the circumference of the fixed wheel. Rolling it over the remaining half will of course duplicate the above results. Therefore, the number of "revolutions, on its own axis, that a wheel will make in rolling once around a fixed wheel of same size," is *two*. Don't you think so? L. M.

Germantown, Phila.

[No, we don't think so! We still adhere to "one," and our correspondent, by his diagram, proves himself wrong. The true starting point is at *a a*, and by observing the several positions of *a*, in the diagram, it will be noticed that the moving wheel makes just one revolution in rolling around the fixed wheel.—EDS.

Raising Water Through Tubes.

MESSRS. EDITORS:—On page 387, Vol. XVII., SCIENTIFIC AMERICAN, your correspondent under the head of "Relative Size of Pump Barrels and Tubes," entertains and communicates erroneous ideas. He says, "1st, The pressure upon piston valves of different sizes in *sustaining* water at the same hight is in proportion to their areas." The pressure on any valve is just the same when in the pump at work as when out of the pump, that is, equal on all sides. As to the sustaining of a column of water in the feed pipe of a pump, all persons conversant with philosophy know it to be by atmospheric pressure on the surface of water from whence it is fed—not by any valve. This will also apply to his second statement.

"3d, The pressure upon valves generally must be in proportion to the products of their areas into the hights at which the water is sustained or raised, etc." Generally! why not always? The laws of nature are unyielding and inevitable. Again, "the greater the amount of friction of the water against its sides in delivering the same quantity of water, and the larger the pump, the greater the quantity of water required in the same time, which would also increase the friction, etc." The first statement is true, but the one following it is erroneous. If we take two pumps, one of double the area of cross section of the other, and the same length of stroke, and run the small one just twice the velocity of the large one, it will require the same amount of water and deliver it with no more ease. In the next place, it matters not how a vacuum is formed at the head of the pipe, the friction is limited by atmospheric pressure. The mechanism used in forming the vacuum at the top of a pump pipe has nothing whatever to do with the quantity of water passing through; the size of the pipe only can govern the quantity. If water be throttled by the incapacity of the feed pipe or the valve opening (which is quite as apt to be the case) so that the water does not follow the piston of a pump as fast as it travels, the speed of the pump should be reduced to the capacity of the supply, or the pipe or valve opening should be increased, as the case may need. A knowledge of natural philosophy with a little common sense to apply it will make all pump difficulties vanish.

A. K. SMITH.

Nebraska, Ohio.

Influence of Artificial Illumination on the Quality of the Air in Dwelling Houses.

MESSRS. EDITORS:—Carbonic acid gas is known to be very injurious to health, and it is, probably, the prevalent cause of bad air. This gas is constantly generated by the various contrivances for artificial light; but no experiments have until lately been made as to the value which this factor of the impurity of air may reach under different circumstances. Dumas states the important fact, that in gas illumination, both the consumption of oxygen and the production of carbonic acid is very considerable. In the *Journal for Biology*, of 1867, Dr. Zoch, a Hungarian chemist, communicates a series of determinations on the increase of carbonic acid in illuminating a room of a known capacity with gas, kerosene, and rape seed oil. Consumption of the lighting material, time, and intensity of light were self-evidently taken into account. In the following table the reader will find the increase of carbonic acid gas in the three modes of illumination calculated for the space of 100 cubic meters (131 cubic yards), and upon a lighting effect of 10 normal flames (1 normal candle = a stearin candle of ⅛ lb.), at the time of 1, 2, 3, and 4 hours.

Increase of $C O_2$ per thousand:

Burning Time.	Kerosene.	Street Gas.	Rape Seed Oil.
1h	0,929	0,708	0,537
2h	1,456	1,342	1,038
3h	1,779	1,513	1,190
4h	1,811	1,562	1,329

From this table it may be seen that rape seed oil illumination generates the smallest amount of carbonic acid gas, and and kerosene most. As this mode of illumination is not very general, it is of no great practical importance that kerosene contributes most to vitiate the air, but it is a very different affair with gas illumination. Who has not noticed of late years in the illumination, of the stores, theaters, concert, and political halls of our great cities the fact that each attempts to rival his neighbor in the glaring effect of gas light, but at the same time who has not also made the observation that the greater the light the greater the oppressiveness and vitiation of the atmosphere. It is certain that this sentiment of discomfort is partly to be attributed to the radiant heat emitted by the flames, but the carbonic acid gas is nevertheless to be considered as its chief cause. The normal amount of this gas in the atmosphere is 0·50 to 0·65 per thousand, and an amount of from 2·75 is only to be met with in hospitals, prisons, and garrisons, where the process of respiration of many individuals is going on.

Artificial Writing Slates and Blackboards.

MESSRS. EDITORS:—On page 391, Vol. XVII., a correspondent asks the best recipe for painting blackboards or plastered walls; allow me to communicate the recipe I prescribed for painting more than 2,000 square feet of blackboard on the plastered walls of the class rooms in the Cooper Institute in this city, when it was organized in 1859; and also several hundred square feet in Girard College, Philadelphia, when I was connected there, as it gave perfect satisfaction and is still used in these institutions.

I first have the place of the wall intended to be covered, surrounded by a narrow wooden molding, which may be covered by paint. Japan or varnish is necessary in the paint, as with benzine alone the lampblack rubs off; but as varnish makes the board too smooth to write on, I mix a little fine emery in it, to make it slightly gritty, like a slate; too much emery or a quality of too coarse a grade makes the removal of the chalk marks difficult. For the last purpose I take sheepskin with the wool on, nailed on a small piece of board and always used dry; it is much better than any thing else. From time to time, however, the whole blackboard is cleaned with a wet sponge. The best substance for fixing the common lampblack and emery, is shellac dissolved in alcohol; the quantities are regulated by the circumstances. In warm weather it requires more alcohol. Too much shellac makes the solution too thick; too little causes it to come off. It is to be put on with a flat brush as rapidly as possible, as it dries at once. The blackboard may be used in less than half an

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hour after being coated. I never noticed the exact proportions used, but had it mixed, and tested it by putting a little on the wall, and added any of the necessary ingredients till it answered the purpose intended.

New York City. P. H. VANDER WEYDE, M. D.

Saws and their Capabilities.

MESSRS. EDITORS :—In the SCIENTIFIC AMERICAN of November 2d, 1867, Mr. Emerson, in answer to some remarks made by Mr Lamar Foss, concerning the power necessary to cut lumber, says that one horse power will cut 1,000 feet of lumber in ten hours running. It appears to me that Mr. Emerson takes exception to a general rule; claiming to do that amount of work with nice, clear, soft, and picked timber. Such is not generally the case; a mill must cut good, bad, and indifferent, hard and soft timber; and I would have supposed that Mr. Emerson would have aimed at giving us a unit power, if I may say so, for cutting 1,000 feet of lumber in a given time, answering the wants of the country at large, instead of making it a sectional affair. The first statement made about that big saw was such that it would induce the reader to believe that fifty horse power would drive it four hundred revolutions in a minute, with six inches feed, through a cut forty-one inches deep. Such a thing is impossible. At that rate, 50,000 feet of lumber in ten hours, with such a speed and feed, would be a very poor day's work. If 50,000 feet of lumber is considered a good day's work, such a big saw is not necessary. I am now running a fifty inch saw, and can cut 50,000 feet of Oregon fir (Douglas pine) in ten hours. One filing lasts us from four to six hours. My rule for applying power to circular saws is the following, the result of experience:

Taking seven-eighths of an inch for maximum feed for each single tooth, and two horse power being the power necessary to drive such tooth through a bolt six inches in thickness, at the rate of 500 revolutions a minute, it would follow that if I wanted to run a saw at such a speed and feed through eighteen inches, using sixteen teeth, or two inches feed, I would have $16\times2\times3=96$ horse power, to be directly applied to the saw. If more or less feed is required, more or less power must be applied in proportion. From the foregoing rules, if the charge of applying power to that big saw was entrusted to me, and if it was really expected from me to run it with the feed and speed before mentioned, allowing only 36 inches cut, I would want $48\times2\times6=576\times4=460\frac{80}{100}$ horse power; and with suitable timber as regard to size and length, I would expect to cut over 200,000 feet of inch boards in ten hours, if the whole could be handled fast enough.

As a last remark, I would say that I believe, from my observations, that it requires fully three horse power to cut 1,000 feet of lumber in ten hours; two for the main saw, and one for the edger, that I have supposed to be at hand for the purpose. These conclusions come from trials made, where a dynamometer was used to ascertain the amount of the motive power, and the timber used was Oregon fir, which I suppose might be considered of average hardness as regards timber generally. It would be well for those engaged in manufacturing lumber to know rather than guess, and a few communications through your valuable paper, no matter how contradictory they might be, would not fail to throw more light on a subject that is yet not well understood. It would be well, if any communication is made, to have the motive power tested, and that on the saw mandrel. J. A. LESOURD.

Oak Point, Washington Territory.

Electrical Phenomenon.

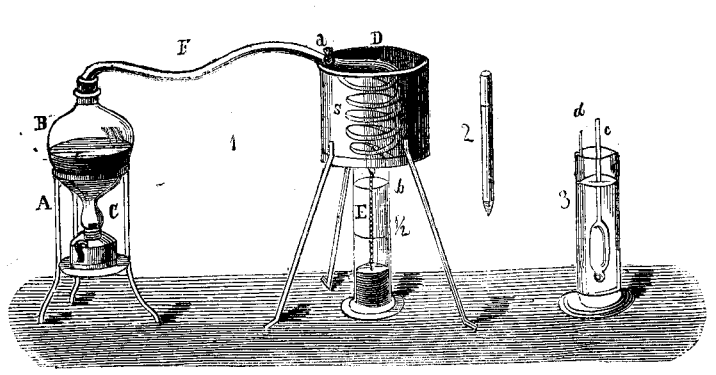
The Rochester *Union* says that one of the most beautiful electrical phenomena imaginable was lately witnessed in the office of the Atlantic and Pacific Telegraph Line. Wire No. 1 of this line was down between this city and Syracuse. Suddenly it was discovered that neither wire would work. A continuous current of electricity was then observed to be passing over the wires through the several instruments, and this while the batteries were detached. The current seemed to be of the volume of a medium-sized pipe stem, and it gave the several colors of the rainbow, beautiful to behold. With the key open, the current flowed in waves or undulations, and from the surcharged wire it would leap over the insulated portions of the key and flow along the wires beyond. The same phenomenon was observed at Buffalo and at Cleveland. The gas in the office here was lighted without difficulty by holding the end of a wire within an inch or two of the gas burner. The current was intense enough to shock one holding the wires or instruments—indeed, one of the employés of the office had his fingers scorched by the current. With closed keys the current was continuous, as before stated.

The theory advanced by an experienced electrician is this. The electrical equilibrium of the atmosphere had become disturbed by the sudden and extreme cold of the past two days—and we may say here that this phenomenon has never been witnessed except when cold weather prevails extensively—the electricity, instead of descending to the earth as in a thunder storm or in warm weather, ascends in the atmosphere, thus destroying the equilibrium and producing these magnificent displays. The broken wire spoken of, which rested on the ground, was the point of communication for the current from the earth. The electrician advances the theory that Aurora Borealis is produced from the same causes, and we submit that it is not an improbable theory. Every one has seen, undoubtedly, the wavy or undulating motions of the Aurora Borealis, and the wavy motions of the current last night with the batteries off and the key open were precisely the same.

Here we may notice one thing not generally known. A portion of the Irrepressible Conflict speech of Wm. H. Seward in this city, a few years since was telegraphed to New York and from Boston to Portland by the electrical influences of the Aurora Borealis—all the batteries on the line being detached. This feat, it is said, has never been repeated.

APPARATUS FOR DETERMINING THE AMOUNT OF ALCOHOL IN FERMENTED LIQUORS.

For the quantitative determination of alcohol in simple alcoholic mixtures the specific gravity plan is generally made use of. This method being based upon the difference which exists between the specific weights of the liquids, recommends itself for correctness and simplicity, and is therefore most applicable for practical use. For liquids, however, in which the alcohol is associated with several substances, this method cannot be employed, for the alcoholic strength bears no distinct relation to the specific gravity of the same. But as it is of great importance for wine and cider manufacturers, as well as for brewers and distillers, to be enabled to determine at any time, during and after the process of fermentation, the exact amount of alcohol of the respective liquids, a practical method for obtaining this end must be considered as of great value, and such appears to be the form



of apparatus first described in the "Chemistry of Wine," by Dr. F. Mohr, of Coblenz, Prussia, and represented in the annexed cut.

A brass frame, A, supports a glass reservoir, B, having a capacity for holding about seven liquid ounces. In the brass water receptacle, D, is a coil of cooling pipe, connected with the glass reservoir and terminating just above the cylinder, E.

To ascertain the proportion of alcohol in any liquor, the cylinder, E, is filled with it, full up to mark, *b*, and this entire quantity being emptied into receptacle, B, heat is applied beneath. Cooler, D, having been filled with cold water, the vapors conducted through pipe, F, are condensed, and drop into the cylinder, E.

The distillate having collected therein precisely up to mark, ½, the alcohol lamp is to be extinguished, and cold distilled water or rain water added thereto, up to mark, *b*. In order not to transgress said mark, the pipette, Fig. 2, is used, by which the water can be added by drops. If then the indications of the hydrometer (Fig. 3) and the thermometer are marked down, the tube accompanying the apparatus will show the precise alcoholic strength of the substance distilled. The table is simple and easily understood. We are informed that Henry Guth, optician, 104 Delancey street, New York, furnishes these apparatus.

Car Wheels---Their Composition and Causes of Breakage.

With the frequent accidents caused by the breaking of car wheels, we know, says the *American Railroad Journal*, of no subject connected with railways demanding greater attention on the part of engineers than the use of the strongest wheels.

In most treatises on iron, the texture of cast iron is said to be granular, it is in fact crystallized as found by chemical experiment and microscopic investigation. Crystals of gray iron being octahedral, their maximum limit when cubic, being $\frac{1}{15000}$ of an inch in linear dimension, and about $\frac{1}{3000000000}$ of a grain in weight; crystals in white or chilled iron are smaller, and most frequently occur in six sided prisms, sometimes connected in fascicles by their ends, at other by their sides, in a sort of stellated or radiated arrangement, as may be readily observed in a fragment from the tread of a chilled wheel.

The density of cast iron is from 7.1 to 7.5 of a porous nature, under hydraulic pressure water having been forced through four inches of metal. By remelting in an air furnace, its strength has been increased up to twelve meltings, though the same result has not been found with the cupola.

The purer the iron is from foreign particles the greater cohesion its crystals have with each other, which constitutes the difference between strong and weak irons. So great is its affinity for other substances, that its ores are seldom found pure, and as the foreign matters form the quality of the metal smelted from the ores, it is evident that each peculiarity of the ore is imparted to the iron made from it.

The best qualities of charcoal pig iron give, by analysis: Iron, 96,992 per cent; carbon, 2,800; silicon, 0,208, with traces of manganese and copper. The tensile strength of the pig, from 18,000 to 28,000 pounds per square inch. Remelted iron from 31,000 to 41,000 pounds.

Charcoal, the fuel with which the ores are smelted. when new and pure, consist of carbon 97 parts, ashes 3 parts. When old, carbon 85 parts, water 12 parts, ashes 3 parts. The best qualities of ores and the fuel show an entire freedom from either sulphur or phosphorus.

The effect of sulphur on iron is to cause brittleness at all temperatures, red shortness when hot, to such a degree that experiment has shown that even $\frac{1}{3000}$ of sulphur is enough to produce brittleness, and $\frac{1}{1000}$ red shortness.

Phosphorus imparts the quality of shortness at low temperatures, and there are but few irons in which a trace of this substance cannot be found. One per cent of phosphorus rendering iron to be of a very bad quality and of limited use.

In the manufacture of car wheels, the pig metal is melted with anthracite coal in the cupola. Anthracite coal contains carbon 88.50 parts, volatile matter 7.50 parts, ashes 4.00. Average specimens of white ash anthracite coal from Pennsylvania contains in 100 parts sulphur 0.91 per cent. All varieties of hard coal contain sulphur in a more or less degree, combined with iron in the form of iron pyrites, disseminated through the coal. Anthracite iron, or iron smelted with anthracite coal, from its want of strength owing to the sulphur and other impurities in it, is never used for car wheels.

Having noted the peculiarities of the best charcoal irons, and charcoal, as compared with anthracite iron and anthracite coal, it becomes a matter of much importance to inquire how far these elements effect the car wheels as generally supplied to railroad companies.

But few, if any, railroads would be willing to risk the use of car wheels made from anthracite iron, even if a proper chill could be put on them to insure wear. The general practice is to remelt the old car wheels with anthracite coal, using from one third to two thirds of new metal. With each remelting the affinity of the iron for foreign substances absorbs the sulphur from the coal, resulting, with each remelting of the old wheels, in a weaker iron, and thus the process goes on from year to year.

How near the mixture thus made, claimed to be pure charcoal iron, is the genuine article, can readily be conjectured; but with this process comes poor wheels, breakage, and loss of life.

Cast iron, when in constant vibration, as in a car wheel in use under express cars, soon wears out, or "become tired," the granular formation is disturbed by the repeated jar of continued motion, as is evident by the failure of wheels under express cars, with less mileage than wheels under cars or engines with frequent stops or long periods of rest.

Another great cause of breakage is due to the extreme pressure used in pushing the wheels upon the axle; a pressure of 10 to 12 tuns per wheel holding it fast, as well as 30 or 40 tuns as is frequently used, which strains the wheel, ending in a cracked wheel after a short time in use.

With a knowledge of these facts one year ago, an extensive car wheel works was established at Ramapo, N. Y., on the Erie railway, for the purpose of making wheels entirely of pure metal from the Richmond and Salisbury mines.

The Richmond iron, famous for ordnance—the United States Government having used not less than twelve thousand tuns for guns—and recently so successfully tried in the Rodman Gun trial at Shoeburyness, England, having a tensile strength of from 31,000 to 41,000 pounds per square inch, has proved itself to be one of the strongest of cast irons for guns.

To ascertain its relative strength in car wheels, experiments were made by the Pennsylvania Railroad Company, July 17th, 1867, in comparison with the wheels in use on this road as follows:

No.	Maker.	Size. in.	Weight. lbs.	*Blows on each wheel.			Total No. of blows.
1	Omitted	33	496	49	24	13	86
2	"	32	631	21	21	45	87
3	"	33	546	9	7	23	39
4	Ramapo	33	519	59	152	80	291
5	Omitted	33	549	36	28	—	64
6	"	32	513	51	43	—	94
7	"	33	510	20	9	12	41

* Each wheel was tested in three places, if not destroyed by previous blows.

By the first set of blows given, all of the wheels, with the exception of the Ramapo wheel, were entirely destroyed, the subsequent blows being given to test various portions of the remaining plates.

The Ramapo wheel, with each trial, was only dented or crushed in, and after many repeated blows on the rim, a portion was broken out to show the texture of the iron.

As to the wearing qualities of the Ramapo wheel, the Erie Railway Company report them equal to any in use. On the Morris and Essex railroad out of 700 wheels in constant use over nine months, with a constant load of 10 tuns per car, running 400 miles a week, but one wheel has failed, and that caused by accident. Similar results are reported from other roads using them. The cost is somewhat higher than the ordinary class of wheels, but the wear and great security amply repay it.

Action of Ozone on Sensitive Photographic Plates.

Dr. Emerson Reynolds stated before the Dublin Chemical and Philosophical Club that he had been performing some experiments upon the above subject, and that he had found that when the latent image (i. e., the image before it was developed) was submitted to the action of ozone it was completely obliterated—not only was it impossible to develop the image, but a second image might be retaken in the camera upon the same plate. The author remarked that this was against the theory which might be called the mechanical theory of photographic images, and proved conclusively that it was due to chemical change in the sensitive film. He also thought that many of the disputes in connection with the length of time dry plates might remain sensitive, was probably owing more or less to the quantity of ozone present in the air.

The ozone used in these experiments was in some cases procured by passing atmospheric air over phosphorus, and in others by the silent discharge, viz., by attaching one of the platinum wires of the reservoir to the prime conductor of a machine, and turning it slowly, the other wire being in communication with the ground.

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HOUSEHOLD HINTS.

REMOVING CORKS FROM BOTTLES.—Sometimes a cork is pushed down into the bottle or vial which it is desirable to remove. A very effectual way to do it is to insert a strong twine in a loop and engage the cork in any direction most convenient. It can then be withdrawn by a "strong pull," the cork generally yielding sufficiently to pass through the neck.

LOOSENING GROUND GLASS STOPPLES.—Sometimes the ground glass stopples of bottles become, from one cause or another, fixed in the neck and cannot be removed by pulling or torsion. An effectual method is to wrap a rag wet with hot water around the neck and let it remain a few seconds. The heat will expand the neck of the bottle, when the stopple can be removed before the heat penetrates the stopple itself. Or, wind a string once or twice around the neck, and, holding the bottle between the knees, pull alternately on one and the other end, thus creating friction and consequently heat. Or a little camphene oil dropped between the neck and stopple of the bottle will often relieve the stopple.

SHARPENING LEAD PENCILS.—A narrow blade—a pen blade—should be used for this purpose, as the back of a wide blade is almost certain to break the lead point just before the point is finished. A little thought will readily show the reason of this.

REMOVING A TIGHT FINGER RING.—It is seldom necessary to file off a ring which is too tight to readily pass the joint of the finger. If the finger is swollen apply cold water to reduce the inflammation, then wrap a small rag wet in hot water around the ring to expand the metal, and soap the finger. A needle threaded with strong silk can then be passed between the ring and finger, and a person holding the two ends and pulling the silk while slowly sliding it around the periphery of the ring may readily remove the ring. If the ring is a plain hoop this process is easy; if it has a setting or protuberance more care will be required. Another method is to pass a piece of sewing silk under the ring and wind the thread, in pretty close spirals and snugly, around the finger to the end. Then take the lower end—that below the ring—and begin unwinding. The ring is certain to be removed unless the silk is very weak. The winding compresses the finger and renders the operation less difficult.

CRACKING GLASS BY SUDDEN HEATING.—Probably more articles of glass in daily use are broken by being suddenly heated than by blows or other acts of carelessness. Glass is a very poor conductor of heat, and when hot water is poured suddenly into a tumbler or goblet, it is almost certain to break unless the glass itself is quite warm. Tepid water should be first used, or a little cold water be poured into the glass on which the hot water may be drawn. Lamp chimneys frequently crack when placed upon the lighted lamp, especially if taken from a cold room. The proper remedy is to turn up the flame slowly or by degrees.

INJURY TO MARBLE AND VARNISHED ARTICLES.—Marble being a carbonate of lime and the two substances not having a very great affinity, care should be taken in the use of marble furniture and ornaments, as tables, mantels, statuary, etc. Acids of any kind will more or less affect marble, and they should not be allowed to touch it. The slabs on which acids are allowed to stand soon lose their polish and are liable to a degree of disintegration which impairs their beauty. Fruits, sauces, vinegar, etc., should not be allowed to come in contact with a marble-topped table or shelf. All varnishes used on woods are to a certain extent soluble in alcohol; therefore all liquids containing alcohol, as wines or spirit, should be kept from varnished furniture.

OIL STAINS IN MARBLE.—Stains in marble caused by oil can be removed by applying common clay saturated with benzine. If the grease has remained long enough it will have become acidulated and may injure the polish, but the stain will be removed.

Number of Useful Plants.

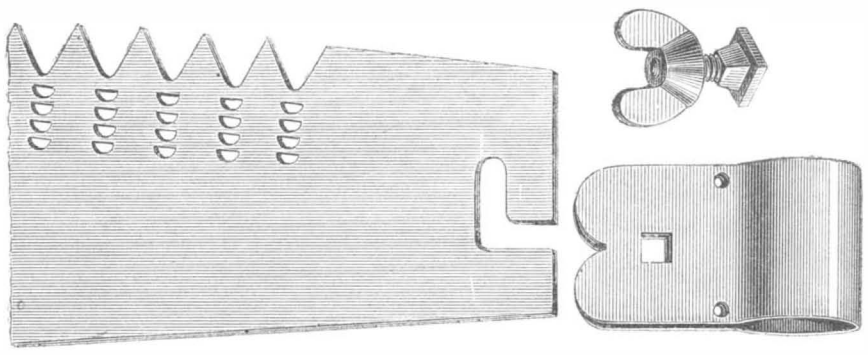
A German author states that the number of useful plants has risen to about 12,000, but that others will no doubt be discovered, as the researches yet made have been completed in only portions of the earth. Of these plants there are 1,350 varieties of edible fruits, berries, and seeds; 108 cereals, 37 onions; 460 vegetables and salads; 40 species of palms; 32 varieties of arrowroot, and 31 different kinds of sugars. Various drinks are obtained from 200 plants, and aromatics from 266. There are 50 substitutes for coffee, and 129 for tea. Tannin is present in 140 plants, caoutchouc in 96, gutta-percha in 7, rosin and balsamic gums in 387, wax in 10, and grease and essential oils in 330; 88 plants contain potash, soda, and iodine; 650 contain dyes, 47 soap, 260 weaving fibers; 44 fibers used in paper making; 48 give roofing materials, and 100 are employed for hurdles and copses. In building 740 plants are used, and there are 615 known poisonous plants. One of the most gratifying developments is, that out of 278 known natural families of plants, there are but 18 species for which no use has yet been discovered.

Cask-Boring Beetles.

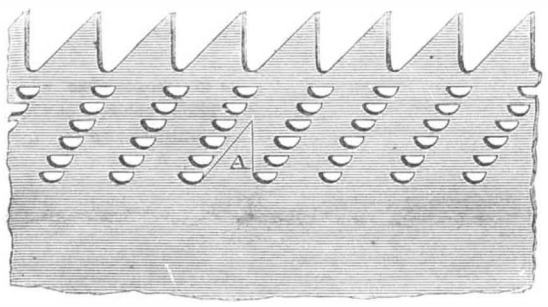
Beer drinkers in India complain that the quality of the pale ale now sent out to them is inferior to that supplied a few years ago; and the importers are crying out loudly about the ravages of a beetle which eats holes in the casks and sets them leaking. Through and through, and up and down, and in all directions, this mischievous little borer makes its way into the staves until they become a mere honeycomb, held together by the hoops. In one of the casks, which was taken to pieces and examined, it was calculated that there were 134,000 perforations communicating with the outer surface, and long processions of beetles were found in the holes. No wonder that assistant commissary generals report a waste of beer by leakage of from twenty-five to fifty per cent. No one seems to know when the pest first appeared in India, but it had been complained of in Burmah before 1855. Since then it has been observed in other places, is equally destructive in all, and was last heard of at Secunderabad. Some people think the germ of the insect is in the wood before it leaves England; others, that it is a variety of the bamboo beetle, which effects a lodging in the casks during conveyance to depots. It can be killed and dislodged only by boiling water. Can none of our naturalists suggest a way of preserving the casks from attack.—*Athenæum.*

Improvement in Circular Saws.

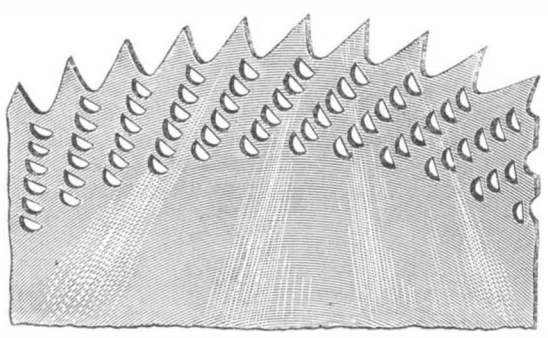
The engravings present views of an improvement in saws which was patented through the Scientific American Patent Agency in this country and Europe by J. E. Emerson, July 16, 1867. Its advantages will be apparent to practical sawyers from the following description: The engravings represent sections of long and circular saws showing the application of the improvement. The semi-circular perforations are intended to obviate the necessity of frequent gumming, as it is well known that three times gumming costs nearly the original price of the saw. In filing, the bottom or space between the teeth is frequently left in an angular form, tending to the rupture of the saw; but in these saws the bottom



EMERSON'S PATENT PERFORATED SAW PLATES.

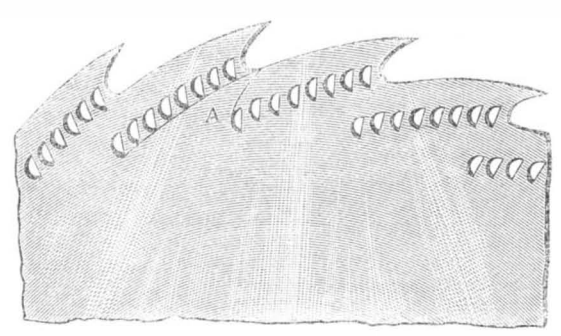


will be always of a semi-circular form, which serves the same purpose as a round hole drilled at the end of a crack, so often used to prevent the extension of the break. The aperture serves as an excellent guide in filing, and enables the workman to keep the teeth of an uniform size and shape and at a



relative distance apart. It will save files, as all practical sawyers know that the first part of a saw file that wears is the corner, which sometimes is entirely worn out before the face is one fourth worn.

In these saw plates the material left between the apertures is softer than the teeth, so it can be easily filed. In hardening—which is done by immersing the plate in a tank of oil—



the plates are cleaned off with sawdust, which is wiped from the surface with a piece of leather. The mixed oil, and sawdust lodges in the holes and when the plate is subjected to the drawing or tempering process this takes fire and by its combustion softens the edges of the holes while the teeth retain their proper temper. The number and position of the holes vary with the size and variety of the saws. By filing the underside of the tooth only, 1⅛ inch of wear may be obtained in a splitting circular saw 16 inches in diameter, while the saw has been reduced only three fourths of an inch in diameter, cutting only three eighths of an inch less than when new. The lines, A A, show the shape of the teeth when filed to the last row of holes. These perforations tend greatly to prevent the saws from heating and aid in their cooling if by friction they become warm.

The larger engraving shows a method of attaching the handle socket for a cross-cut saw. It adds nothing to the cost and is exceedingly handy. Its operation is sufficiently plain without particular reference to the parts of the engraving. All communications should be addressed to the American Saw Company, No. 2 Jacob street, New York city.

Discovery of Roman Remains.

About the commencement of November a mere accident—the plowing up of the upper stone of a Roman mill—induced examination of a field situated on the glebe farm in the township of Amotherby and parish of Appleton-le-Street, with surprising results. The Rev. James Robertson, of Appleton, is the explorer, and this gentleman has up to the present time laid bare a series of large paved floors, varying from 6 inches to 2 feet 6 inches below the surface of the land. Beyond the fact that an occasional piece of Roman pottery was picked up in the soil, there was no indication of any remains in the field, and the present discoveries have, therefore, come upon the antiquarians in the neighborhood most unexpectedly. The place is very near the supposed junction of two great lines of Roman road—one from Derventio to Isurium, the other from Eboracum to Prætorium; of the former, the affix "in the street" marks the route, and the latter is defined by a line of small camps and the name "Roman-road." The field in question has been tried in various places, and the pavements have been found over a wide area. So far no trace of walls or foundations has been found; they are simply pavements. These are irregular in outline and varying in size, one being 150 feet across. Some are detached, while others have paved pathways as connections. The floors are paved with blocks of oolite limestone and sandstone (the latter mostly burnt quite dark in color) and sea pebbles, in some parts flat slabs of limestone being paved edgewise. The floors are not level, but fall off to the sides. Under the crown there is generally a deposit of ashes, charcoal, and burnt animal bones. Below this is a second pavement. All round the edges the burnt matter extends—a sort of breccia, which yields quantities of broken Roman pottery of various kinds—wheel-made and otherwise. Some bits of Samian ware have been found. The hand-made pottery is very rude. Singularly, nearly the whole of it—nine pieces in every ten, certainly—consists of the rims of various vessels. A few necks and handles of amphoræ have turned out. The major part of the pottery is found round the edges of the floors, and somewhat below their level. The teeth present are those of the ox, deer, hog, dog, and bones of birds. Nearly a complete skull of the wild boar was found. Two upper stones of mills (querns) have been found, several fragments of the nether millstones, but not a perfect one. Between the paving stones much Roman pottery has turned out. Of implements, none have been found of metal, but a remarkably fine red flint "scraper," a flint "drill," and some other flints have been picked up, with a "spindle whorl" of Samian pottery and another similarly formed (unpierced) of stone. Some scraps of iron—one half of a very small horseshoe, not grooved—have also been found. One illegible silver coin, and two small brass Roman coins of Constantine have been picked up. Several peculiarly rubbed sea pebbles and other stones, some grooved, have been found. The full examination of the field will occupy a length of time. The floors found are left bare for inspection. The excavations were suddenly stopped on Saturday by heavy rains, and the places cut out in the clay, in which the floors are, are now full of water, on which there is a thick cover of ice. The nature of the ground is such that the water will be retained for a long time, and it is thought no further digging can now take place till next summer.—*London Times.*

The American Mountain Railway.

Essentially the system of Dr. Fontaine's mountain railway was illustrated and described on page 197, Vol. XVI. We are now in receipt of a large diagram and descriptive pamphlet showing the embodiment of some improvements on the original plan. As now constructed an ordinary balloon is to furnish the ascensive and motive power; a platform midway between the passenger car and balloon is provided with wheels which run on an elevated inclined railroad provided with sets of double rails. The ascensive tendency of the balloon, being in part restrained by the rails, is resolved into two forces, one of which is perpendicular to the inclined plane, the other acting parallel to that plane; the former causes the wheels to adhere to the upper rails, the latter drawing the elevator upward obliquely. When the summit is reached, water is pumped into a compartment of the car and the extra weight causes the balloon to gradually descend. The action of the wind upon the balloon is counterbalanced by the weight of the cars which by their traction act as counterpoises, and conjointly with the buoyancy of the balloons, prevent the bending of the elevators on their axes. The advantages claimed by the inventor over the Fell or other mountain railways, are safety, a high rate of speed, cheapness of construction, and the superiority of an elevated over surface roads during the winter months.

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USE OF SCREW PLATES---TEMPERING SAWS FOR MACHINISTS' USE.

Screw plates and screw dies are often ruined by being used upon iron and steel rough from the forge, and covered with scales, which from their hard, gritty nature, grind away the threads. In all cases the rough scale should be removed from the iron or steel, either by the turning tool, file, or grinding stone, previous to screwing it with the screw plate or the dies. It is not an uncommon practice with some workmen, after they have finished forging a piece of iron work, and while the iron is at a red heat, to immerse it in water and partly cool it, with a view of giving the work a cleaner appearance; but this is a very bad custom, especially when the forging requires to be screwed. It very often happens that the iron contains veins of steel, which harden by immersion; and, though the metal may not be so hard as to prevent its being cut with a hard turning tool, still, when it comes to be screwed with the stocks and dies, or with the dies belonging to the screwing machine, or with the screw plates (which tools are always less hard than the turning tools), it will spoil the dies or the screw plates; and because this hard place or places do not happen to be detected when turning the work (on account of using a very hard tool), the steel the dies or screw plate is made of will be thought bad, or badly tempered. The fact is, the work should always be annealed rather than hardened. In all cases when an impure iron is made use of for forgings, and which will subsequently require to be screwed, either with the screw dies or the screw plate, or which may require to be cut with circular cutters or with circular saws, the forgings should always be annealed previous to leaving the smithy. The forgings, of course, will be the better for being annealed, supposing they are to be screwed with the screw tools belonging to the turning lathe; though it is not of so much importance as when they are to be screwed with the dies, or the screw plate, or cut with circular cutters, or circular saws, because the screw tools belonging to the turning-lathe can be ground again, provided they chip from being very hard; whereas, the generality of screw dies, screw-plates, and circular cutters, and even circular saws, when very hard, and once spoilt, will not admit of being again sharpened, but will be practically useless, until they have been annealed, and cut up again, and subsequently hardened. Annealing makes the iron more uniform in temper, and will save much subsequent trouble; it will greatly facilitate the work when fiting it up.

When it is required to harden a large quantity of stout circular saws at once (for cutting metals), they may be enclosed in a sheet-iron case, or box; they will require to be surrounded on all sides with either wood or animal charcoal. Sufficient space, of course, must be left every way for the expansion of the saws; otherwise they will become buckled in heating. After the saws are inclosed and the box luted with clay or loam, the whole may be placed in a suitable furnace or hollow fire and the saws heated to a cherry-red heat (the fire of course must not be urged.) As soon as the whole arrive at the proper uniform temperature, the box must be drawn towards the mouth of the fire, the lid taken off and the saws taken out separately. They may either be taken out of the box with the pliers or by a small rod of iron, having a small hook turned upon one end of it. The saws will require to be immersed edgeways in a trough containing water, the surface of which must be covered with a film of oil. The oil will float of itself upon the surface of the water and burn upon the saw as it passes through it. The burnt oil forms a coating of coal upon the saw, which protects it from the direct action of the water, and lessens the risk of fracture.

Though saws are the better for being inclosed in a box and surrounded with charcoal when heating them, still, when a single saw is required to be hardened in a hurry, it will be more expeditious to place it upon a piece of cold sheet-iron, and then to heat the iron and the saw in the midst of the ignited fuel of a hollow fire; and when it arrives at the proper temperature, it must be taken off the plate and immersed in the hardening fluid. By placing the saw upon a piece of cold sheet-iron, it causes the heat to be very slowly applied, and it has a tendency to prevent the saw buckling in heating. Oil alone, or oil in which tallow has been dissolved, is sufficient to give the thinnest kinds of saws a sufficient degree of hardness; but those of a medium thickness are the better for being hardened in solid tallow (the saws may be placed separately between two flat lumps of tallow). Tallow differs from oil in the absorption of heat for its fusion; consequently, a more considerable degree of hardness is given to the steel by the tallow than by the oil; besides, it hardens the steel to a greater depth than oil. Very thin blades of steel may be made sufficiently hard for some purposes by heating the blades to a red heat and then placing them between two heavy surface plates; the surface plates will be better if they be smeared with tallow, previous to putting the blade between them. When the saws are removed from the hardening trough, they are generally brittle and warped; consequently, they will require to be tempered and hammered flat. The tempering may be performed in a variety of ways, depending of course upon the size, shape, and quantity. Circular saws, which are required for sawing hard substances (such as iron or steel), and which have a round spindle hole, about one inch in diameter in them, will require to be tempered to a light straw color. These may be tempered by first brightening their surfaces, and then placing them upon a piece of hot iron. The piece of iron which will be required for tempering these kinds of saws may be made by the following method. Take a piece of round bar iron, one inch in diameter and eight or nine inches in length; heat one end of it and hammer it so as to make it fit into the small square hole in the anvil; at the opposite end of this piece of iron and at about two inches from the extreme end, weld a moderate sized iron collar; the collar should be made of half round iron, so that it will, after it is welded upon the piece of round bar, form a large lump, the shape of a round ball. The object of this large lump is to retain the heat for a considerable time, so that several of the saws may be tempered before the iron will require to be reheated. If two of these lumps were made, one of them could be in the fire becoming heated, whilst the other lump is being used; so that, if it were necessary, a continuance of the process may be kept up. The object of having this lump the shape of a round ball, is that it may not supply the heat too suddenly to the saw. If this lump was made flat, it would supply the heat too suddenly, unless it was used at a very low temperature; it is evident it would not then temper more than one or two of the saws before it would require to be reheated. The object of having this round lump welded upon a piece of round bar, is for the convenience of keeping the lump in position upon the anvil, and to prevent the operator from always being in a stooping position when tempering the saws. The iron being finished, it is now ready to be heated for tempering the saws. The large lump will require to be heated to a red heat, after which the opposite end of the iron must be placed in the hole in the anvil. The saws may now be placed (one at a time) upon the lump; a slow rotary motion must be given to the saw, by the use of a small stick of wood, in order to equalize the heat. The end of the round bar at the top of the lump will help to supply heat and keep the saw in position whilst it is being turned round upon the lump. As soon as a light straw color appears upon the saw, it must be taken off the iron and cooled, either in water or oil; or, if the heat has not been too suddenly applied, the saw may be allowed to cool in the air of its own accord. These kinds of small circular saws are generally, after hardening, convex on one side and concave on the other. This imperfection is owing to the outer part of the saw becoming too small to contain the central part. When the practice of securing the saws upon the spindle by circular plates screwed firmly against each side is adopted, a small degree of regular convexity is not very detrimental, because the plates bring the saw straight; but, when they are convex in a greater degree they will require to be slightly hammered. The outer part of the saw is the part which requires to be hammered, in order to expand the outer part and bring the middle flat.

These kinds of saws may be tempered, and the trouble of brightening their surfaces spared, by smearing them with oil or tallow and holding them one at a time over a slow clear fire until the oil or tallow begins to smoke, after which the saw must be immersed in oil and partly cooled; it must then be held over the fire a second time, until the oil again begins to smoke. If the saw is immersed in the oil and held over the fire a third time, it will ensure a more regular degree of temper. Care must be taken each time the saw is heated not to raise the temperature beyond that which is necessary to cause the oil to smoke; otherwise the saw will become too soft for the purpose it is intended for—namely, cutting hard substances. By this method the saws acquire the same temper as that which they acquire when tempered to a straw color. A large quantity of these kinds of saws may be tempered more expeditiously by threading them upon a piece of iron wire, and then placing them in a proper vessel with as much oil or tallow as will cover them (the wire is for convenience in lifting the saws out of the vessel), and then to place the whole over a small clear fire, or over a gas flame, until the oil or tallow begins to smoke, after which the saws must be taken out. They may then be cocled in water or oil, or they may be allowed to become cool in the air. This indicates the same temper as that called a straw color.—*Ede.*

Preserving Fresh Flowers.

Flowers may be kept in pretty fair condition, say for a week or ten days, according to the species selected for bouquets and the time of the year, by renewing the water every alternate day, and while doing so rejecting decayed flowers and leaves, and taking care to cut off from the stems immersed in water, with a sharp pair of scissors, about from a quarter to half inch of the length; then should be added to the water about a pinch of salt, and a few grains of saltpetre for every pint of fluid; when flowers are very much faded they may be revived by immersion of the stems for two or three minutes in hot water, or better yet in strong spirits of wine, or Eau de Cologne; in some cases liquid ammonia may be advantageously applied to the stems for a few minutes to revive flowers. These recommendations are applied by several of the largest horticulturists of Ghent and other parts of Belgium, and found to answer in practice very well if properly applied. To keep well, flowers should not, after being cut, be placed in localities where there is tobacco-smoke, or bad ventilation, neither should the rooms be too much heated.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

There are ten marble quarries now in successful operation in West Rutland, Vt., and three others in process of development. The entire thickness of the stone in these quarries is nearly fifty feet, and it is so stratified that it can be easily worked in separate layers, ranging from two to six feet in thickness. Successive stratas frequently present a great variety, both in color and quality, from purest white, the marble so valued by sculptors, to the coarsest of colored rocks, the best often lying in close proximity to the poorest.

One of the last and most important events of the year 1867, was the completion of unbroken communication between this city and the Rocky Mountains. A temporary railway bridge thrown across the Missouri railway at Omaha, was the last link of this line constructed.

A gentleman of San Francisco has made arrangements with European capitalists to introduce the cultivation, on a large scale, of the sugar beet, and to establish factories for the production of raw sugar therefrom, in California. The capitalists have agreed to invest $1,500,000 in the enterprise, and to import six or seven hundred skilled laborers. The California beets, it is said, will yield two per cent more sugar than those of France, and as the industry is now so profitable in the latter country, the prospect is encouraging for its growth in the Golden State.

Prof. Whitney reports that of the sixty-four elementary substances existing in nature, so far as known to chemists, there are but thirty-six which have yet been proven to occur in California in mineral combination, and twenty-three elements are wanting on the Pacific coast. Of these, a few are extremely rare, such as didymium, erbium, lanthanum, thorium, but the absence of others is surprising. Fluorine, a substance of very general distribution, in its most abundant source, fluor spar, seems entirely wanting in California, although it may yet be discovered in the micas. Taking the whole Pacific coast, from British Columbia to Chili, the following facts appear. The paucity of species, considering the extent of region as compared with other parts of the world; the remarkable absence of prominent silicates, especially of the zeolites; the wide spread of the precious metals; the abundance of copper ores, and comparative absence of tin and lead; the similarity in the mineralized condition of the silver; the absence as vein stone of fluor; no mineral species peculiar to the coast.

In the United States, at the beginning of the year 1868 there are now, 38,821.81 miles of railway built and actually operated. The aggregate cost of construction has been $1,660,460,809. Pennsylvania has the greatest number of miles in operation, viz., 4,252.10; Ohio ranks next, with 3,397.84 miles; then Illinois, 3,224.49 miles. Oregon has 19.50 miles. The cost of construction for each mile has been greater in New Jersey than in any other of the States, and in California next, being for the former, $70,857; for the latter, $70,824.

The Tucker Manufacturing Company, in Boston, is the originator of a process for bronzing castings, which possess the color and the true aspect of cast bronze, without being galvanized, or covered with an alloy, as ordinarily done. The process consists in coating the articles to be colored with a very thin layer of some vegetable oil, and exposing them to a temperate heat. The oil, on being decomposed, combines with the film of oxide formed on the surface of the metal, thus yielding that peculiar color of bronzed iron. The temperature to which the castings are brought is not so high as to carbonize the fatty matter; it only reaches that point at which the metal for itself is getting blue. The brown layer thus obtained is said to be as durable and protective as that resulting by the method hitherto practised; at least, the process met with great appreciation in Paris.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

POCKET GRAIN TESTER.—B. Martin, Prairie du Chien, Wis.—The object of this invention is to obtain a neat and light instrument by which the relative weight of grain, as compared with its bulk, may be readily ascertained, and which can be made so small as to be conveniently carried in the pocket.

HAND ROLL AND TWISTING MACHINE.—R. Moxley, Muscatine, Iowa.—This invention consists in a new and more simple and compact arrangement of the parts of a hand roll and twisting machine, by which labor is saved, and the machine more easily operated than heretofore.

PRINTING MACHINE.—James McDermott, Frederick, Md.—This is a hand printing apparatus. The type is held in a curved bed, or turtle, and the inking roller has a corresponding shape. The type are made of India rubber, and are retained in their places by the flanges of the adjustable spacing bars, which rest upon the base piece of each letter. At the end of the bed piece is an inking apparatus, consisting of reservoirs of ink of divers colors, if required, with mouths from which it exudes on to the roller.

CORK EXTRACTOR.—James Morton, Philadelphia, Pa.—This invention relates to a new device for extracting the cork-screw, with the cork, from the neck of a bottle, and consists of three bars, of which one has a socket or cap fitted to its lower end, to be placed upon and around the upper end of the bottle.

FOUNTAIN INKSTAND.—N. Gray Bartlett, Keokuk, Iowa.—This improvement is intended to remedy a defect in ordinary fountain inkstands, and consists in the employment of an overflow chamber, so disposed in the inkstand that its bottom or floor stands slightly above the floor of the duct leading from the reservoir to the pen orifice or fountain tube.

BOXED HONE.—Joseph Potter and Olif Abell, Whitehall, N. Y.—This invention consists in encasing the hone, or whetstone, or other grinding material, in a wooden or other box, in such a manner that its grinding surface projects above the box, and so that it cannot fall out or be easily removed from the box, and in providing a cover for the said box, whereby the grinding surface of the hone may be protected from injury.

CHANGE GATE.—John B. Slawson, New York city.—This invention relates to a gate to be arranged in the doors or walls of railroad cars, stages, and other public vehicles, said gate being so arranged that it can be opened on either side, and that it will at once close itself when released, the gate being connected with a bell, which will be struck whenever the gate is opened.

CULTIVATOR.—A. Bennett, Rockford, Ill.—This invention relates to an improvement in corn cultivators, and consists in the combination and arrangement of a sulky frame mounted on two wheels, and double plow beams attached thereto, for the shovels to work on both sides of a row of corn, in such a manner as to be entirely under the control of the driver in his seat.

MECHANICAL MOVEMENT.—Ephraim Soper, New York city.—This invention relates to a new manner of arranging the cranks of machinery, and consists in fitting gear wheels to the crank, so as to obtain from a stationary pinion, mounted on the wrist pin, additional revolutions or parts of revolutions for the shaft.

DEVICE FOR RAISING CASKS, BARRELS, ETC.—Robert Smith, Brooklyn, N. Y.—This invention relates to a device by which casks, barrels, and other similar articles can be easily transported up or down stairs or steps, and also on level ground, and consists chiefly in the use of a frame, which is provided with a series of wheels on its under side. These wheels are arranged in rows in such a manner that when the frame is drawn up steps one wheel will always be on the edge of a step, and the device can thus be drawn up stairs with ease.

COFFEE MILL.—W. J. Lane, Washington, N. Y.—This invention relates to a new and useful improvement in that class of coffee mills which are fitted in the upper part of a box provided with a drawer and arranged like an ordinary hand mill for grinding spice. The invention consists in the application of a flange to the lever part of the mill for the purpose of giving a downward direction to the ground coffee and preventing it from flying about or being scattered in its discharge from the mill, a contingency attended with considerable annoyance as the ground coffee finds its way between the sides of the drawer and box and every time the drawer is withdrawn from the box the latter requires to be cleaned thoroughly in order to avoid waste and to admit of the ready insertion of the drawer.

STAMP MILL FOR CRUSHING QUARTZ.—George R. Mitchell, Nevada, Colorado.—The chief difficulty attending the operation of stamp mills for crushing quartz consists in the wearing of the stems and the lower boxes of the same, a result due to the adhesion of pulverized rock or quartz to the stems and the introduction of the pulverized rock or quartz into the boxes by the elevation or upward movement of the stems. This invention fully obviates this difficulty and it consists in introducing into the lower boxes of the stems water from a supply pipe and in such a manner as to keep the stems perfectly clear or free from the pulverized quartz and also keep the stems in a perfectly lubricated state.

REAPING AND MOWING MACHINE.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a new and improved reaping and mowing machine of that class in which the sickle or sickles are driven by a cam and lever in lieu of the ordinary crank and connecting rod. The invention consists in a peculiar construction of the sickle, driving apparatus, grain-discharging device and adjustable wheels on the main frame, whereby a very superior reaper and mower of the class specified is obtained.

EYE GLASSES AND SPECTACLES.—J. J. Bausch, Rochester, N. Y.—This invention consists in constructing and arranging eye glasses or spectacles in such a manner that the two parts which contain the lenses may be adjusted

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in such relation to each other and to the eyes of the wearer that the lenses when the eye glasses or spectacles are adjusted on the nose, will have a proper relative position with the eyes.

COMBINED GRAIN DRILL, ROLLER AND PLANTER.—T. S. Mills, Kendleville, Ind.—This invention relates to a new and improved combined grain drill, roller and planter, and consists in a novel construction and arrangement of the parts, whereby several advantages are obtained over other similar combined implements now in use.

BERRY BOX.—Truman Mabbett, Jr., Vineland, N. J.—This invention is designed to supersede the small baskets and boxes now used for conveying berries and small fruit to market. The invention consists in a novel construction of the box, whereby the berries are effectually prevented from being bruised or injured in their transit from place to place, a free circulation of air allowed therein when a series of boxes are packed within a case and the boxes rendered capable of being manufactured at a very moderate cost.

MACHINE FOR POINTING PICKETS.—W. W. Johnson, Nashville, Tenn.—The object of this invention is to point the ends of pickets or fence palings and cut circular sides or edges on other wood work.

HORSE COLLAR.—Thomas Moore, New York city.—This invention relates to an improvement in the construction of horse collars.

ANIMAL TRAP.—James P. Wigal, Henderson, Ky.—This invention has for its object to furnish an improved self setting animal trap which shall be simple in construction, convenient, and effective in operation and not liable to get out of order.

ATTACHMENT FOR HARNESSES.—W. W. Beebe, Dubuque, Iowa.—This invention relates to an attachment for either single or double harnesses, the object of which is to overcome and cure in a horse all inclination to be balky when driven, whether such horse is in single or double harness.

IRON FOR HARNESS PADS.—Heber R. Ridgley, Mansfield, Ohio.—This invention relates to an improved method of forming the frame iron of harness pads, and the attaching of the pad thereto.

GATE.—Ralf Adams, Ottawa, Ill.—This invention is a gate which can be opened from a vehicle or the saddle. It has a rack operated by levers, the rack engaging with a pinion on the bottom of the post of the gate, with other devices perfecting the whole mechanism.

MOVABLE BARREL STAND.—P. J. Skinner, Oswego, N. Y.—This invention, as its name imports, is a movable barrel stand for use in groceries or liquor stores where many barrels are employed and set in rows.

WORM FENCES AND PENS.—John Will, Bryan, Ohio.—This invention relates to an improvement in worm fences, and consists in a fence divided into panels or sections, composed of rails or boards bolted together by upright cleats and having notches at either end, the notches at one end being on the under part of each board and fitting into notches between two cleats on the upper part of the boards of the adjoining panel.

CHURN.—A. J. Heavner, Time, Ill.—This invention relates to an improvement in churns, and consists in a dasher constructed in two parts, one part working within the other, the two dashers being operated by two cranks working simultaneously.

SAFETY PLUG FOR BOILERS.—T. G. Eiswald, Providence, R.I.—This invention consists of small fusible plugs placed at the low water level of boilers, and provided against being prematurely blown out by being located in conical seats. When the water level passes below the plugs they are melted out, and thus announce the state of the water.

CARPET STRETCHER.—Alexander L. Dunbar, Sheldon, Ill.—This invention relates to a novel and useful implement or device for stretching carpets when to be laid or put down by tacking or otherwise, upon floors, which implement is so constructed that it can be applied to the carpet, and suitably operated to stretch it and there hold it.

COMBINED CATHETER AND SYRINGE.—Dr. N. B. Sornborger, Northampton, Mass.—The combined catheter and syringe embraced in this invention is provided with a collar on its body or cylinder, susceptible of adjustment at will, and thus through a stem or rod connecting it with a collar arranged to slide upon the discharge tube or passage of the syringe.

BAGGAGE CHECK.—Edward Flather, Bridgeport, Conn.—This invention relates to an improved baggage check, and consists of a slotted arm or bar revolving on a screw set in a circular disk on which the names of various places or numbers are marked. The name of the place desired to be indicated is seen through the slot in the arm which is secured in place by a pin attached to the arm and fitting into a hole in the disk. Or the required number may be indicated by the pin being set into the hole opposite thereto.

IMPROVEMENT IN GATES.—Lewis Essig, Clinton, Ohio.—This invention relates to a new and improved method of hanging and operating the gates of farms, plantations, &c., whereby the same are easily opened by a rider, without alighting for that purpose.

IMPROVED AIR CONDENSER.—H. J. Bailey, Pittsburgh, Pa.—This invention relates to a new and improved apparatus for condensing air for various purposes, but more particularly for forcing liquids; and the invention consists in an arrangement of vessels, which communicate with each other by pipes or tubes—such communication being controlled by valves or cocks, which are operated by floats and governed by hydraulic pressure, whereby the apparatus is made automatic or self acting.

IMPROVED ANNEALING FURNACE.—W. R. Thomas. Catasauqua, Pa.—This invention consists in the construction of a furnace for annealing car wheels whereby the hubs of the said wheels may be raised to a high temperature without injury to the hardened or chilled rim or tread of the wheel; and also in placing rings of metal between the wheels, as they are placed in the furnace for the protection of the rims.

IMPROVEMENT IN WATER WHEELS.—William Snodgrass, Cold Spring, Wis.—This invention is to so construct a water wheel that the full or nearly the full per centage of power may be obtained, which is due from water under a given head; and the invention consists in providing for a free escape of air from the buckets or floats, and in bringing the full pressure of the water to act upon a given point of the wheel, in a manner similar to the action of water on the piston of a water engine.

IMPROVED ARGAND GAS BURNER.—George Mooney, Providence, R. I.—This improvement relates to the manner in which the burner is formed, and to the method of regulating the flow of the gas; and the invention consists firstly, in forming the burner of one piece of metal; secondly, in forming the gas jet apertures without drilling, and thirdly, checking and regulating the flow of gas by a screw.

IMPROVEMENT IN CRUTCHES.—James C. Rhodes, Stillwater, Minn.—This invention relates to a new and improved device for preventing the end of a crutch from slipping on ice or other slipping places; and it consists in arranging an adjustable spur or point in the end of the crutch.

IMPROVEMENT IN CULTIVATORS.—James B. Sexton, Pella, Iowa.—This invention has for its object to furnish a simple, cheap, convenient and durable cultivator.

INSTRUMENT FOR DRAWING AN ELIPSE.—Franklin Bowly, Winchester, Va.—This invention relates to an improved instrument for describing elipses of various diameters, and consists in a marking rod, on which is a graduated scale for fixing the major and minor diameters of the elipse to be described, which marking rod is connected with two sliding rods that govern its elliptical motion around a common center pin.

BLOCKS OR SUPPORTS FOR THE KEEL AND BILGE TO VESSELS IN DOCKS.—Joseph T. Parlour, Brooklyn, N. Y.—This invention more particularly relates to a block for supporting a vessel by its keel or bilge when laid up in a dock for repairs, which block is made in parts or sections for adjustment, either in a higher or lower plane, as may be desired.

MANUFACTURE OF PENS.—Edwin Wiley, Brooklyn, N. Y.—The present invention relates to that class of pens commonly known as the "Union Pens," and which are made with their nib of gold, and their heel or body of silver or other inferior metal.

CORN HUSKING MACHINE.—H. W. Knowlton, Saratoga Springs, N. Y.—This invention relates to a new and improved machine for stripping Indian corn from the stalks, and taking the husks from the ears. The invention consists of a pair of stripping rollers, one of which is armed with stripping blades, in connection with a series of husking aprons arranged to work over rollers, whereby the ears of corn may be broken or detached from the stalks, and the husks removed from the detached ears with the greatest facility.

STREAM OR RIVER FENCE.—H. A. Kephart, Fletcher, O.—This invention relates to a new fence to be placed across rivers and streams. The invention consists in a novel construction and arrangement of parts whereby due provision is made against the passage of cattle or animals around the ends of the fence when the stream or river is low, and provision also made for the passage of drift wood over the fence without the liability of the same being injured thereby. The invention also consists in a novel construction and application of the fence at the central or deep part of the river or stream whereby said portion of the fence may be readily put up or adjusted, and not be liable to be injured by drift wood or floods.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek in formation from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. G., of Canada.—The oil used by woolen manufacturers is either that known as gallipoli, an inferior sort of olive oil, or palm oil, neither of which are very expensive.

J. A. G., of Pa.—We do not know of any chemical which could be mixed with light varnish to make paper water proof. The ordinary varnish to coat maps, however, which you probably require is prepared by pulverizing 1 oz. sandarac, ¼ oz. mastic, ¼ oz. elenir, dissolving them in ½ oz. of venet. turpentine, and adding to it a solution of 1 oz. shellac and 3 oz. oil of lavender in 12 oz. alcohol.

J. B., of Ky.—In reply to your inquiry as to the manufacture of crucibles, you will find in one of the first numbers of this journal of 1867, in an article, "Plumbago and its use," some remarks on the manufacture of plumbago melting pots which perhaps may be useful to you.

G. A. H., of N. Y.—The difficulty you encounter in forming an alloy of platinum and copper may have its reason in different causes, of which we are not aware, not having witnessed your operations. Platinum we suppose you know, can only be melted before the oxy-hydrogen fire. You will find much information about the melting of platinum in referring to the articles of M. Deville, in the back numbers of the "*Annales de chimie et physique.*

J. W., of Mass.—Phenylic alcohol (carbolic acid) in the proportion of about one per cent after having been previously dissolved in water will undoubtedly be an excellent means of preventing mold in flour paste.

C. H. G., of Tenn.—"What cheap material can be mixed with plaster of Paris that will leave it as hard or harder no matter what color it will produce?" Most anything will depreciate the quality of plaster of Paris, which should consist of nothing but sulphate of lime. We remember that at the late fair of the American Institute in New York a premium was refused to an exhibitor of that product because the judge of the group happened to find some carbonates in it.

E. W., of Mass.—Oil when put on boots will scarcely have any protective influence against cold. . . . In painting the outer coating of a Leyden vial you will insulate it. Electricity in the Leyden jar resides on the glass as is shown by the experiment with the three separable pieces (*vide* Sillimann's "Principles of Physics," chapter, Accumulated Electricity), but we close the mouth of the jar, as the air itself is a conductor of electricity, particularly when moist. For the stuffing of the rattle snake you speak of we recommend to you crude naphtalin; it is preferable to arsenic soap.

A. P., of Ky.—For the detection of sulphur or better, sulphur compounds in water, heat it in a test tube while holding a strip of paper impregnated with sugar of lead over the orifice. If sulphur is present the paper will be covered with a brownish film. Lime will show itself by adding oxalate of ammonia to the liquid. The iron in the water you speak of must be present as a protoxide and then a blue color will be produced by adding red prussiate of potassa. The sulphur may either be present as H S or Ca S.

B. C., of N. H., asks if the subjection to smoke, as in the baconing process, would have a preservative effect on stakes to be driven into the ground and what substances in burning produce a smoke of the strongest creosoting effect? Mere exposure to smoke will never do for the preservation of stakes, especially if employed for agricultural purposes. For such and other purposes we recommend as the cheapest and best material the so-called pitch or dead oil. Heat the oil in an iron pot and fill a tight barrel to the hight of about two feet and leave the stakes in it for two and a half or three hours. The pitch or dead oil is obtained in the distillation of benzole and other light hydrocarbons and can now-a-days be purchased in every large city.

G. F. W., of Mass.—Provence oil is the *oleum olivarum otim* of the Pharmacopœia and is obtained from the pericarp or fleshy part of the olive before perfect maturity.

J. L. D., of Mass., asks how to put quicksilver on the back of a looking glass. The coating of a mirror is made by spreading tin foil smoothly on a stone table, rubbing a little mercury (containing tin) over it to amalgamate the surface, pouring a large quantity of mercury on it, pushing the clean glass plate on this, beginning along one edge, pressing it with weights and giving the table top gradually an inclined position to drain off the excess of mercury.

V. D. W., of N. Y., adds to the information given on page 391, Vol. XVII., to "C. S., of Minn.," who asks how to tin a worn copper kettle., the following: A thick coating may be obtained by preparing a tinning solution of zinc dissolved in hydro-chloric or muriatic acid, making the solution as thick or heavily charged with zinc as possible, adding a little salamoniac. Clean the inside of the kettle, place it in a charcoal fire until a piece of block tin placed inside melts, then rub the melted tin, with some of the tinning solution quickly on the copper surface by means of a ball of oakum and a little powdered resin; the tin will readily adhere. Wrought iron and steel may be tinned in the same manner. We know of no effectual method of tinning cast iron.

E. A. L., of Mo., asks if there are any clocks made which are specially designed for use on locomotive engines and calculated to keep time notwithstanding the jars of the machine. We think such clocks are quite common. They are what are called "spring clocks." We lately saw a steam fire engine with one attached, and a fire steamer is subject to as many and as severe jolts as a locomotive.

S. A., of Iowa, says he has cleaned his steam boilers with soda and asks if its use is detrimental to the iron. We reply, it is not.

R. S. B., of N. Y., referring to the communication of "C. B.," page 35, current volume, on harmonizing church bells, asks why the plan cannot be introduced in sleigh bells, and recommends the manufacture and arrangement of the "merry sleigh bells" so as to produce concord rather than discord. We have seen several sleigh teams so ornamented, but the owners themselves were compelled to make a selection from many "strings." They were not arranged to hand.

W. W. T., of Mass., asks what sort of a filter he shall use for purifying the water flowing from a spring into his trout hatching boxes. We recommend passing the water through a filter of charcoal and gravel. A little manual entitled "The House," published by G. E. & F. W. Woodward, 37 Park Row, New York city, has an engraving and description of such a filter as W. W. T. needs.

H. H. C., of N. Y., inquires for a method of determining the required amount of lap on a slide valve to cut off at any given point, the stroke of the valve *not* being known! We cannot furnish the information desired.

W. P. G., of N. H.—Potassium and sodium melt below 212 degrees, the temperature of boiling water. Silver requires 1,873 degrees Fah., for fusion while cast iron requires 2,786 degrees.

T L. S., of Me.—The enamel of iron hollow ware is made of powdered flints, ground with calcined borax, fine clay, and a little feldspar. This mixture is made into a paste with water and brushed over the pots after they have been scoured with diluted sulphuric acid and rinsed clean with water. While still moist they are dusted over with a glaze composed of feldspar, carbonate of sodium, borax, and a little oxide of tin. Thus prepared, the pots are gradually dried and then the glaze is fired or fused under a muffle at a bright red heat. Oxide of lead, although increasing the fusibility of the glaze, impairs its efficiency as it will not resist the action of acids in cooking.

P. J., of Pa.—It is a mistake to suppose that water will not affect the composition of glass. At a high temperatuae water acts upon glass very rapidly. Turner suspended plate and window glass in the steam of a high-pressure boiler, and in four months the specimens, one-fourth of an inch thick, were completely decomposed. Faraday found that flint glass under similar circumstances was still more rapidly acted upon.

B. A. B., of N. J.—The *kaolin* or porcelain clay used in the manufacture of fine "China" ware is furnished by the decomposition of a granitic rock, the constituents of which are quartz, feldspar, and mica.

Business and Personal.

The charge for insertion under this head is one dollar a line.

For Gas-Pipe Screwing and Cutting-off Machines for Hand or Power, or any tool used by Steam and Gas Fitters, address Camden Tool and Tube Works Co., Camden, N. J.

A Large Marble Factory to rent on the Hudson River. Address Davis' Machinery Yard, 124 Hudson st., Jersey City.

Parties in want of Fine Tools or Machinists' Supplies send for price list to Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Patent Office Reports.—Persons desiring Patent Office Reports can be supplied at low prices. Address Samuel C. Jones, Box 773, New York City P. O.

Wanted—Parties to build the Geiser thresher and separator at Racine, Wis., ground for shops will be donated. Address W. W. Dingee, Racine, Wis.

Parties having shoe lace tagging machinery for sale, new or second-hand, address postpaid, box 106, Toronto, Ontario.

Parties having patterns for cast brass ferrules for chisel handles will receive orders by sending address to S. F. Gold, Cornwall, Conn.

Manufacturers of shingle machines please send circulars and price list to A. J. Shotwell, Montgomery Station, Daviess Co., Ind.

Wanted—A small plainer (bed 5 or 6 feet), new or second-hand, if in good order. Address J. & B. S. Ayars, Greenwich, N. J., with price and description.

Allen's Catalogue of Agricultural and Household Implements and Machinery, Seeds and Fertilizers.—Messrs. R. H. Allen & Co., 189 and 191 Water street, New York, who conduct the largest business in Agricultural and Horticultural Implements, of all American houses engaged in general dealings of the kind, have just issued a new edition of their very complete and handsome Catalogue for the current and coming season. It fills 225 pages, illustrated with nearly 400 engravings, and is sent to applicants for $1—less than the actual cost of production, and this amount is deducted on the receipt of orders from those who have paid it.

EXTENSION NOTICES.

Morris Mattson, of New York city, having petitioned for the extension of a patent granted to him the 4th day of April, 1854, for an improvement in enema syringes, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of March next.

Carmi Hart, of Bridgeport, Conn., having petitioned for the extension of a patent granted to him the 4th day of April, 1854, for an improvement in machine for cutting veneers, for seven years from the expiraton of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of March next.

James McCarty, of Reading, Pa., having petitioned for the extension of a patent granted to him the 4th day of April, 1854, for an improvement in heating skelps for the manufacture of wrought iron tubes, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of March next.

L. Otto P. Meyer, of Newtown, Conn., having petitioned for the extension of a patent granted to him the 4th day of April, 1854, for an improvement in treating caoutchouc and other vulcanizable gums, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of March next.

Samuel J. Parker, of Ithaca, N. Y., having petitioned for the extension of a patent granted to him the 11th day of April, 1854, for an improvement in sewing machines, for seven years from the expiration of said patent, which takes place on the 11th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 23d day of March next.

James L. Cathcart, of Georgetown, D. C., having petitioned for the extension of a patent granted to him the 18th day of April, 1854, for an improvement in attaching propellers to the driving shaft, for seven years from the expiration of said patent, which takes place on the 18th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of March next.

James Buell, executor of the estate of James McGregor, Jr., deceased, of New York city, having petitioned for the extension of a patent granted to the said James McGregor, Jr., the 11th day of April, 1854, for an improvement in the construction of tea and coffee pots, for seven years from the expiration of said patent, which takes place on the 11th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 23d day of March next.

Julia M. Colburn, administratrix, *de bonis non*, of James H. Stimpson, deceased, who was executor of James Stimpson, deceased, of Baltimore. Md., having petitioned for the extension of a patent granted to the said James H. Stimpson as executor aforesaid, the 17th day of October, 1854, and antedated the 17th day of April, same year, for an improvement in vessels for holding liquids, for seven years from the expiration of said patent, which takes place on the 17th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of March next.

Stephen Bazin and James A. Bazin, of Canton, Mass., having petitioned for the extension of a patent granted to them the 25th day of April, 1854, for an improvement in machinery for laying rope, for seven years from the expiration of said patent, which takes place on the 25th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of April next.

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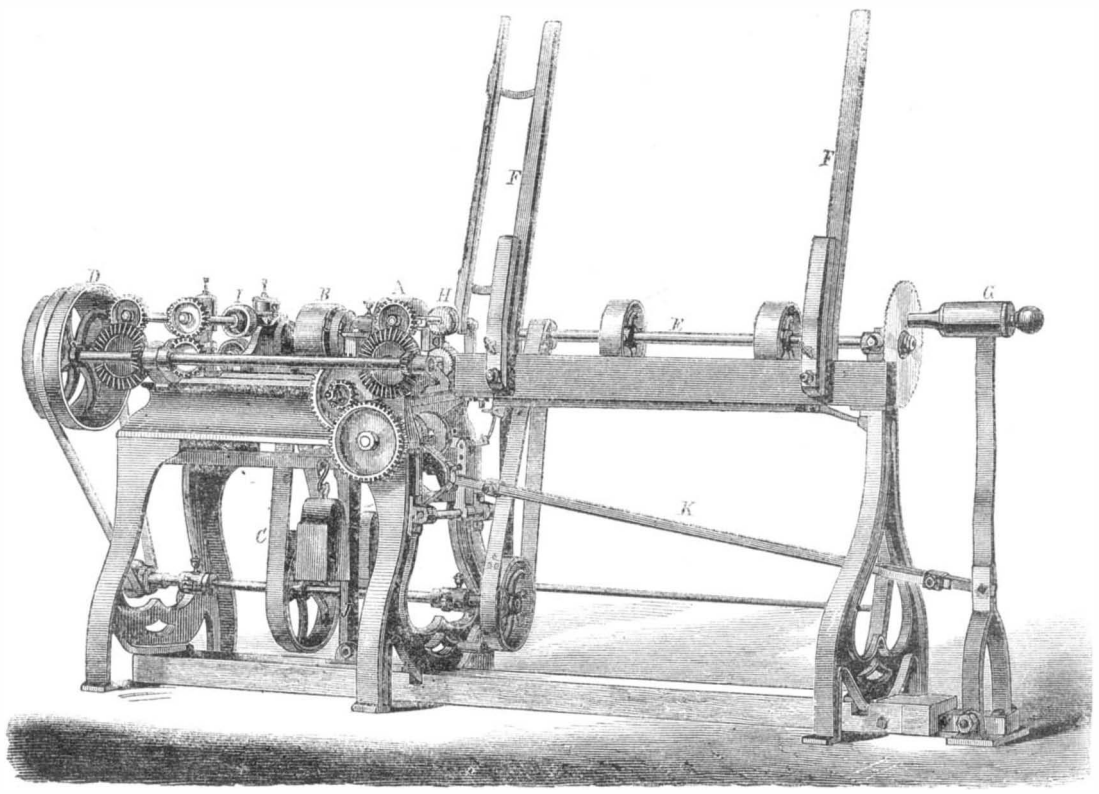
Improved Automatic Taper Lathe.

The rapidity with which many kinds of wood turning can be done by the automatic machinery now so extensively used for this purpose is somewhat surprising, the patentees of the lathe represented in the accompanying engraving, claiming to turn at the rate of from 1,000 to 2,000 running feet per hour.

The power is applied on the cone pulley, A, into which is screwed the cutting head having cutters running in the shavings box, B. The cutter head and cone form a hollow mandrel. A belt, C, leads from a pulley on the cone arbor to the shaft under the bed of the lathe, thus giving motion to the feed cone, D, and saw shaft, E. In turning handles—broom handles for instance—the sawed stuff is piled upon the rack, F, when a cam draws forward the frame, and the saw cuts off the sticks to the required length, while, at the same time, a gimlet at each end bores holes through the sticks. The frame then recedes and the mallet, G, operated by a cam, strikes the lower stick, driving it into the feed rollers, H, which are fluted, and draw the stick into the hollow mandrel, whence it passes, after being turned, to a second set of rollers, I. The rollers are adjusted to the size of the stock to be turned by set screws. The taper, swell, or other irregularity on the work is given by a pattern cam operating the upright lever, J, which actuates the ring case that governs vibrating arms in the cutter head. The connecting rod, K, through which the mallet, G, is operated, is coupled so as to be adjusted to any required length of stuff, and the foot of the lever which holds the mallet can also, be moved as aid to the same result.



WEST'S PATENT LATHE FOR TURNING UNEQUAL DIAMETERS.

The regular size of the lathe turns from five-eighths of an inch to one and a half inches diameter. By having extra heads this limit may be greatly increased. The manufacturers say that one man, with this machine, can do at least the work of four men with the ordinary lathes. It is capable of turning nearly all sorts of handles, chair stuff, billiard cues, map rollers, etc., giving the work an excellent finish.

Patented April 17, 1866. All communications relative to this latter should be addressed to Finley & Co., Geneseo, N. Y.

Picric Acid and Its Properties.

In a lecture delivered before the Society for the Encouragement of National Industry in France, Dr. Calvert, F. R. S., spoke of a curious application which has been made of the explosive property of its salts. During these last few years, the picrate of potassium has been employed in great quantities by Mr. J. Whitworth, for charging the bombs for destroying the iron plating of ships. When the projectiles thus prepared strike the iron masses, the enormous propelling force with which they are expelled from the gun is instantaneously converted into heat, and to such an extent that the ball becomes red hot, the heat decomposes the picrate of potash, and a violent explosion ensues, owing to the enormous quantities of vapors and gases which are thus produced in an instant of time.

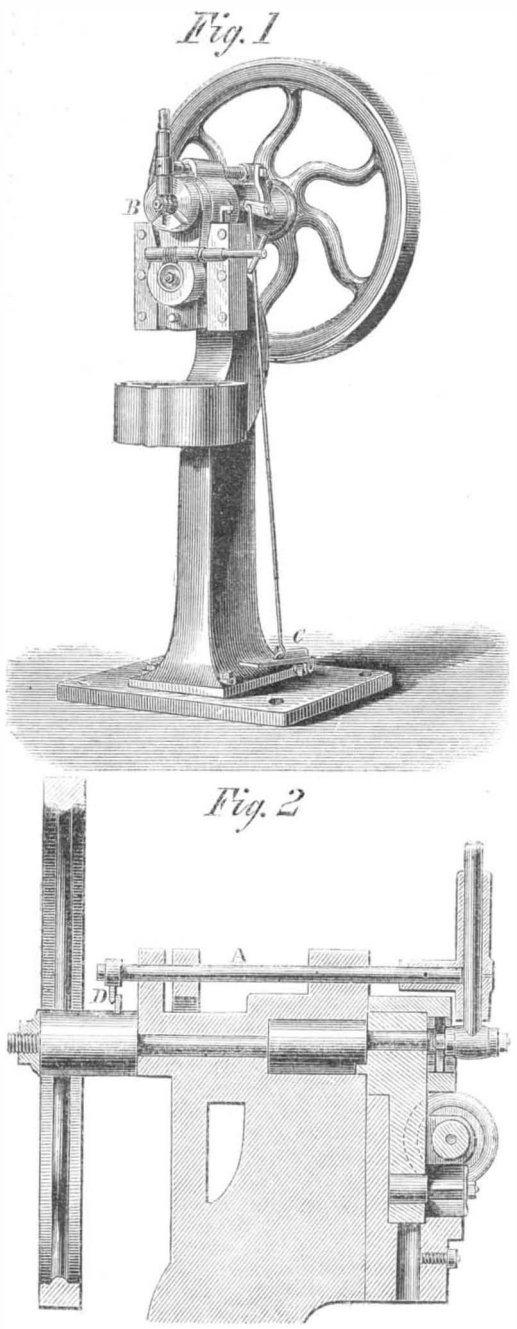
Whilst the alkaline picrates are endowed with such formidable properties, they also possess others which are useful for the alleviation of human misery. Picric acid is an efficacious remedy in intermittent fevers. Persons affected with such types of fever, upon whom quinine has lost all its beneficial effects by continuous usage of it—and this is the case with some of our soldiers who return from India—derive, I am glad to say, wonderful benefit from the use of picric acid and picrates, as Dr. Aspland has proved to be the case at the military hospital at Dukinfield. The knowledge of this fact may be useful in districts in which poor populations exist, for it affords them a cheap febrifuge; and, moreover, picric acid is not dangerous, as arsenical preparations are, nor does it derange the stomach like quinine.

Diffusion.

Some very elegant and simple methods of exhibiting the phenomena of diffusion are given by Herr Merz in a recent number of the *Journal für Praktische Chemie*. A portion of the shell of an egg having been removed by the action of hydrochloric acid, leaving the membrane exposed, the egg is to be suspended in water from the arm of a balance, a counterpoise being placed in the opposite scale. In about half an hour the weight of the egg has sensibly increased, as the position of the balance beam will show, in consequence of the passage of water through the membrane. If, how, alcohol be substituted for the water, and the weights readjusted, so as to bring the beam horizontal, it will soon commence to move in the opposite direction, showing that the egg has become lighter by the diffusion of water into the alcohol. The diffusion of vapor may be exhibited by tying a diaphragm of India rubber—a portion of a small toy balloon will answer the purpose—over the mouth of a funnel, the other end being in communication, by means of an elastic tube, with a vessel of water. The funnel being inverted over a dish containing ether, which, however, the diaphragm is not to touch, the vapor of this fluid will pass rapidly into the funnel, the air being observed to escape in bubbles in the water at the small end. Remove now the vessel of ether, and the operation will be reversed, the vapor passing through the diaphragm into the atmosphere. In order to fill the vacuum thus created, the water will rise in the tube, the lower part of which should be of glass, to render this apparent, and the diaphragm will be curved inwards. These experiments are particularly instructive, and are within the reach of every one. The balance may be extemporized by means of a light bar of wood.

WILDER'S PATENT PUNCHING PRESS.

The power press has become a common tool in our machine shops. As usually built it has serious objections. It is used



not only for perforating sheet metals, but latterly for finishing the surfaces of forged pieces to give a better surface and diminish the amount of hand work necessary to produce a good finish. The common power press is actuated by means of an ordinary clutch which necessitates such a jar and jolt to the driving power as seriously to interfere with the equable action of the machine. The clutch is at any time and under any circumstances a very poor mechanical contrivance, and its use is avoided, as much as possible, by mechanics.

The engravings accompanying this article show a prospective view of one of Wilder's Patent Punching Presses of the smallest size, without gearing, and a vertical section of the upper or working part. Fig. 1 is the perspective, and Fig. 2 the sectional view. Mechanical perfection is not to be expected, but this machine seems to be capable of no very radical improvement. It is so designed that any size of press required can be made without any considerable change in the construction of the parts.

Fig. 1 is a perspective of the press, which, it will be seen, is of pleasing proportions. The power is applied to the wheel by means of a belt, and actuates the plunger in the usual manner, by cam or eccentric. The stop motion is very simple and smooth in its action. It is a sliding bar, A, at the top of the machine—seen drawn on a larger scale in the vertical section, Fig. 2—carrying a dog, which, when the plunger is at work, locks into a mortise in the revolving disk, B, Fig. 1. This stop motion adds no strain to the press when the machine is working, the strain or wear being no more than if there was no stop motion attached. It is held in a locked position by the foot on the treadle, C, and so long as the treadle is pressed down the press will operate, but if the foot be removed the plunger will instantly stop and always in the highest position, an advantage of no little moment, as all machinists know. By removing the foot from the treadle as soon as the plunger begins its downward movement, it will make but one stroke and will be unlocked by the dogs, D, Fig. 2, on the shaft and slide. The length of stroke is adjusted by the horizontal worm shaft seen on the front of the machine, and the stroke may be lengthened or shortened when the press is in motion as well as when at rest.

Patented May 28th, 1867. G. & C. Place, 222 Pearl street, New York city, are the agents for this press. Communications respecting the machine should be addressed as above, or to Moses G. Wilder, patentee, West Meriden, Conn.

Artificial Meerschaum.

Vegetable ivory has long been known, but vegetable meerschaum, vegetable horn, or vegetable coral, as they may with strict propriety be called, are late acquisitions, brought before the public for the first time during the late Exposition. The mode of preparation of these substances is as follows: Common potatoes are peeled and macerated for about thirty-six hours in water acidulated with eight per cent of sulphuric acid. After this operation they are dried in blotting paper, and then in hot sand for several days on plates of chalk or plaster of Paris which are changed daily; being compressed at the same time, an excellent imitation of meerschaum, answering well for the carver, or any purpose not requiring a high temperature, will be obtained. Greater hardness, whiteness and elasticity will be produced, if water containing three per cent of soda, instead of eight per cent sulphuric acid is used. And if, after the potatoes have been macerated in the solution of soda, they are boiled in a solution containing nineteen per cent soda, a substance resembling stag's horn, and which may be used for knife handles, etc., will be formed. Turnips may be used instead of potatoes in the production of the artificial horn; and if carrots are substituted for the potatoes, a very excellent artificial coral will be obtained.

NEW METEOROLOGICAL INSTRUMENT.—Prof. De la Rive, of Geneva, has contrived an instrument for measuring the transparency of the atmosphere. The inventor agrees with Pasteur, who supposes that the light dry fog which under certain conditions of the air intercepts the light, is caused by myriads of organic germs floating near the earth, which are washed to the earth by the heavy rains, or are destroyed by severe frosts, thus accounting for the clearness of the atmosphere at these times. Convinced of the truth of these statements, a determination of the state of the air, it seems, would be of benefit in a sanitary point of view; hence the value of this invention. A complete description of the instrument has not fallen under our notice, but it principally consists of a double telescope with a single eye piece, by which two objects at known distances may be compared, and thus the transparency of a measured stratum of air is directly determined.

INCOMBUSTIBLE CLOTHING FOR WOMEN.—It is stated that no ballet dancer of the Queen's Theater, London, is allowed to dance in garments that have not been saturated with a solution of tungstate of soda. This mineral is now extensively used in the laundries of London. It prevents the fabrics with which it is incorporated from blazing, and does not impair the colors or appearance

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Scientific American.

MUNN & COMPANY, Editors and Proprietors

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents for the SCIENTIFIC AMERICAN.
☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street.

VOL. XVIII., No. 5....[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, SATURDAY, FEBRUARY 1, 1868.

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INVENTORS---THEIR OPPORTUNITIES AND INTERESTS.

The number of patent claims published in our columns weekly is sufficient evidence of the existence of a large amount of inventive talent in the country; that all these patents do not prove remunerative, or that some of them are improvements only in name, does not militate against this statement. Still, the long list of patents might be much further extended, we think, by the more general cultivation, by our mechanics, of a habit of close observation. An observing and reflective man, possessing natural mechanical capacities, can hardly pass through a workshop in any department of industry, without seeing opportunities for improvement either in the tools and other appliances used, or in the methods of doing work. But it not unfrequently is the case that the mechanic who is constantly engaged on the work does not notice the room for improvement which the stranger sees at a glance; the familiarity induces indifference. Yet, the working mechanic is continually meeting with obstacles to rapidity and perfection of work, and in providing temporary expedients for relief, he may as well perfect them and make them permanent and valuable fixtures of the shop. If properly elaborated and wrought out in the brain before being built, he may find that in developing them he has unconsciously become an inventor—made a patentable and valuable improvement—where he looked only for a present aid, or a "make-shift." Perhaps the exactions of his business will not allow him to devote the necessary time and attention to the improvement, and he must content himself with getting up hastily a temporary aid to his work.

But there come opportunities for this mental labor, which, however, are not always embraced. Such is the present state of dullness in business. The enterprising mechanic whose ordinary work fails him, can profitably employ his otherwise unoccupied time in attempting improvements in the materials, methods, tools, or other appliances used in his business. If he is compelled to a state of comparative physical idleness, so much more room and opportunity is afforded for the exercise of his mental powers. Plenty of instances of valuable discoveries, inventions, and improvements could be adduced to prove that such periods of enforced bodily inactivity have been advantageous to the observant and thinking mechanic.

It is the interest, also, of the inventor to make use of the means offered by our patent laws to secure to himself a portion of the advantages which his improvement possesses. A false idea of honor is that which either carelessly or supinely refuses to allow the inventor to reap a benefit from his improvement. He may consider it as not worth the expense, time, and trouble necessary to make him secure as its originator; but if others deem it valuable enough to use, he should deem it valuable enough to be paid for. It is not the marked and notable improvement that is always the most remunerative to the inventor, but often the little and seemingly unimportant advance on previous attempts, which proves a mine of wealth. If the inventor has any idea which he has so far brought toward a practical and visible form as to be understood, and which promises to be an improvement on processes, machines, tools, etc., it is his duty, as well as right, to secure his proprietorship by a patent at once. By this course he will be benefitted, while nobody will suffer an injustice.

CUMBROUSNESS OF TOOLS FOR IRON WORKING.

A correspondent insists that the massive lathes and enormous planers, etc., which are deemed requisite in the large machine-making establishments, where heavy work is done, are a waste of material, an annoyance by their excessive weight, and unnecessary absorbers of power. He proposes lathes with hollow arbors, planers where the tool, rather than the work, shall be moved, and drills brought to the work instead of the work brought to the tools.

Many years ago, we knew of a "big planer," got up by Mr. Seth Wilmarth, then of South Boston, Mass., the "feed" of which was a screw, we think sixty feet long, but which was cut on a ten or twelve feet lathe by being fed through a hollow arbor and delivered through another hollow arbor on the tail of the lathe. The consequence was a screw-fed planer which could not, at that time, be matched in the world.

Now, it seems that if a continuous screw could be cut on that lathe for that especial purpose, another screw might be cut, or a shaft be turned of any requisite length, on any ordinary lathe having proper heads.

We have seen a planer, the movable bed of which could sustain a load of thirty tuns, and which was run by a special steam engine, take off two chips at a time of seven-eighths of an inch in depth by over one-eighth in thickness. But all the mass of thirty tuns must be moved alternately back and forth, the machinery sustaining the immense shock of the weight and the inertia of the load in the change from one part of the reciprocating movement to the other. It requires power—its direct exercise and palpable expenditure — to run such a machine, while it seems as though the lighter weight of the tools and their head might be much more easily moved. In regard to the use of boring tools on a massive gear or pulley, the plan is already in practical use. If the boring machine (portable) is carried to the work, power is emitted from the boiler through pipes in the form of steam, or is taken from a convenient shaft by means of belts.

We do not believe in carrying so called "improvements" so far as to shock common sense by the advocacy of novelties which cannot be proved to be real benefits, but it does seem to be practicable to so adapt the proportions of work to be done to the tools to do it, that some, at least, of the heavy labor now really necessary in our large machine and engine shops might be avoided, and some of the power now expended saved.

COMPRESSED AIR AS A POWER.

The successful machinery used for tunneling Mont Cenis, in Switzerland (by which the water power of a mountain torrent is made to compress air, and this compressed air led by strong tubes in the tunnel is made to move the boring machines), has given occasion to some mechanical engineers in France to make plans for transmitting the water power of a river through air tubes to the adjacent city, and bring the tubes into the houses, as gas and water pipes now are, so that by turning on the supply of compressed air, the escaping air may ventilate the building, after moving small appropriate engines, and so serve for sewing machines, turning lathes, and many other kinds of machinery requiring so little power that the erection of a steam engine would be a needless expense. In many instances the total amount of work done at intermissions during a whole day amounts to only three or four hours, for which the steam engine is kept running ten hours; therefore a great saving would be accomplished with this power, which would be consumed only when real work is done.

At present steam power costs in France 62 centimes (12 cents in gold) per hour per horse power; the gas engines are said to cost 73 centimes; this new compressed air power, when steam engines are used to compress the air, will cost 67 centimes; and when water power is used it would come as low as from 12 to 16 centimes (about 3 cents) per horse-power per hour.

With the exception of a few weeks in dry summer seasons, an amount of water falls over the dam at Fairmount, Philadelphia, representing several thousand horse-power, which perhaps could be utilized in the same manner, compressing air and distributing this fresh air through tubes to localities where small amounts of cheap power and good ventilation are needed.

Compressed air is now beginning to be used to dispatch letters and parcels through tubes. In Paris such a system is in operation, and in New Jersey one is in course of construction between the cities of Newark and Jersey City. In London even a passenger railroad is propelled through very large tubes by the same means. However, in all these instances steam is the initiative power used. At the late Fair of the American Institute an experimental machine of this kind by the same means propelled thousands of persons through a large tube.

NITRO-GLYCERIN---ITS USE, ITS DANGER---WHO SHALL DECIDE WHEN EXPERTS DISAGREE?

Although the existence of this substance, and a knowledge of its explosive nature, has been long known to chemists, it was only in the year 1864 that it was brought into public notice as a substitute for gunpowder. Consequently, all our practical acquaintance with its effects has been gathered within the last three years, and new facts are continually presenting themselves as its use becomes more and more general, which it is well to note.

The elements of nitro glycerin separate with immeasurable velocity, and hence the violence of its explosion, which has been variously estimated at from five to ten times the force of gunpowder. Other economical advantages over gunpowder, in mining operations, may be summed up as follows:

Fewer men are required for working the same sized piece of ground, and fewer holes have to be bored to dislodge an equal amount of rock. Hence a dearth of miners may, to a certain extent, be remedied in this manner, and less steel and iron need be used than hitherto.

Nitro-glycerin does not take fire readily, and when lighted burns but does not explode and goes out as soon as the flame is taken away. The holes can be tamped without danger. After firing the amount of smoke is small compared with that of powder, so that workmen can go back immediately to the place where they have blasted without inconvenience. Finally, holes that have missed fire can be retamped and fired, an operation at present either impossible or accompanied with great danger.

Against these advantages, it appears that the gases formed during the explosion have an injurious effect on the organs of sight and respiration. In course of time, however, the workmen get accustomed to it, and it is no longer looked upon as one which need restrict its employment. Nitro-glycerin, further, freezes easily, and explodes on being sharply struck, but the latter property is not more dangerous than the danger of gunpowder in taking fire readily and exploding.

The latest nitro-glycerin disaster that has come to our notice was the explosion at Newcastle, Eng. In the course of the inquest on one of the victims some interesting evidence was brought out. From the testimony given on that occasion by a Mr. Isaac Bell, whom *Engineering* seems to accept as good authority, it would appear that under a great variety of conditions this substance is liable to spontaneous decomposition. At ordinary temperatures this catastrophe may take place, and particularly is it dangerous if impure in composition. The gases given off, if confined to the vessel containing the liquid, exercise pressure on the remaining liquid, and explosion of the vessel is liable under the least shock or movement. If the explosive is brought from a cool to a warm place; if the substance be exposed to a temperature of 46° Fah., crystallization ensues; or if the temperature is high enough to cause ebulition, under any of these circumstances spontaneous decomposition would result.

The inventor of "blasting oil," Mr. A. Nobel, of Hamburg, asserts that nitro-glycerin can be stored for an indefinite length of time without deteriorating in quality, and that the peculiar property of not exploding by mere contact with fire, renders its carriage, storing, and handling very safe, even when in an explosive state. Mr. Bell, *per contra*, asserts that the compound is liable, from its specific gravity (which is 1·6) to explode from mere movement, and is consequently very dangerous merchandise for a railroad company to transport.

The former gentleman, writing to the London *Times* relative to the same Newcastle accident, bitterly complains that the introduction of this valuable explosive, owing to the accidents resulting, as he afterwards shows, from gross careness, has been systematically opposed, and thinks it high time that the public should know that nitro-glycerin has won its battle over prejudice, and obtained far to firm a footing in several countries ever to be banished from use unless it be by something better. The want of that useful knowledge has been the real cause of the late accident, for no one surely would attempt to store an explosive substance in a city unless unreasonable fear threw an obstacle in the way of conveying it to and storing it in its proper place. He says: "My own printed precautions, lately produced at the trial, best prove how strongly I object to that unreasonable mode of storing; but the puerile refusal to receive it in a powder powder magazine may place an agent in a very embarrassed situation. Instead of adopting every measure to paralyze the circulation of a powerful and useful agent, it were far better to follow the example of Mr. Warrington Smythe in enlightening the public as to its use, thus making it a beneficial instrument for the development of our mineral wealth.

"It not to be wondered at that the immense accidents of Aspinwall and San Francisco led to rigorous measures restricting the transportation of nitro-glycerin; but in Sweden and Norway that substance was already so favorably known and had got into such constant use, that the excitement abroad had no influence on the liberal regulations there, and until this day it is freely carried by rail in both countries, nor has it led to a single accident.

"In Germany, also, before the prohibition took place, thousands of parcels containing nitro-glycerin were sent by rail, without causing the least damage.

"On the other hand, we find upon inquiry that accidents have only occurred when nitro-glycerin was transported under a wrong declaration. Such was the case at Aspinwall and San Francisco, and it is only too natural that such unwarrantable neglect should lead to calamities. It is the same with gunpowder. Whenever people convey an explosive material the first thing they ought to know is its nature."

Then follows a list of nitro-glycerin accidents which have come to his knowledge, and in looking over the list it must be admitted that the substance has been very strangely abused:

"In five cases congealed nitro-glycerin has been melted purposely over fire.

"In three cases a red-hot poker has been inserted into the oil in order to melt it.

"In one case a man kept a cartridge with a percussion cap and fuse affixed and lighted it in his hand until it blew off.

"In one instance a man stood watching the burning of a fuse inserted into nitro-glycerin, until it went off and hurt him.

"In one case a captain set fire to a sailing vessel with a cargo of nitro-glycerin, and people went on board to extinguish the fire, but saved themselves, seeing what was the cargo, and the ship was eight hours on fire before it blew up, which could not possibly have been the case with gunpowder.

"In one instance two workmen, while filling cartridges with nitro-glycerin at the light of a tallow candle, set fire to some gunpowder strewed on the floor, but found time to save themselves and carry away considerable quantities of nitro-glycerin before the explosion took place.

"In one case two leaky canisters, full of nitro-glycerin,

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were soldered under continual reports produced by the heating of drops leaking out, but caused no accident.

"In one case a captain of artillery was hammering on a shell filled with nitro-glycerin, until it exploded and killed him.

"In one case a man took to greasing the wheels of his wagon with nitro-glycerin, not knowing what it was, and it went all right until it struck hard against something, and the wheels went to pieces.

"In one case it was burnt in a lamp, as an improvement on petroleum."

Last in the list comes the Newcastle explosion, which, it seems clear, was caused by the grossest violation of the printed instructions. The cans containing the nitro-glycerin were opened with blows of a spade, and then thrown into a hole one upon another. From the shock thus occasioned the explosion took place.

This list is published that these accidents may serve as a warning against similar attempts to perform these feats, but the inventor protests against the very narrow view of trying to check the career of any improvement on the plea of liability to accidents. "There is," says he, "a very easy way of getting rid of them; we need only prohibit the use of steam, fire, poisonous substances, cutting tools, firearms, explosives, etc., and return to those days when ignorance and safety went lovingly hand in hand. But unless civilization is to be stopped, we cannot possibly confine the community to those articles only which it is impossible or even difficult to abuse. Something must be left to the understanding, and it is an excellent regulator. Thus, for instance, phosphorus, one of the most dangerous poisons and combustibles, is in every child's hand, and yet does but little harm."

THE AMERICAN WOOD PAPER COMPANY AND THE FIBER DISINTEGRATING COMPANY.

A case of great importance to patentees, upon the validity of Reissues, and illustrating the importance of having a correct description of the invention in the original specification, has just been decided in the U. S. Circuit Court for the Eastern District of New York.

In this case the American Wood Paper Company filed a bill against the Fiber Disintegrating Company to restrain the defendants from the use of certain inventions for which Letters Patent had been granted to the inventors in this country and by them assigned to the complainants. The whole of the inventions related to the manufacture of paper pulp from crude vegetable substances by means of chemical agencies applied at a high degree of temperature in a vessel or boiler of peculiar construction.

The patents, five in number, alleged by complainants to have been infringed by defendants, were:

(1st and 2d.) Watt & Burgess patents, being two reissues (Nos. 1,448 and 1,449) dated the 7th April, 1863, of a single reissue, 5th October, 1858, of original patent, dated 19th August, 1853, for improvements in the manufacture of paper from wood.

The two reissues were one for the product obtained by, and the other for the process of treating wood so as to produce paper pulp by boiling in caustic alkali under pressure.

Mellier's patent, dated 7th August, 1854, for an improvement in making paper pulp from straw. The process being very similar to that described in the reissued patents of 7th April, 1863, and 5th October, 1858.

(4th and 5th.) For improvements connected with the machinery for the purposes of making paper pulp. But the only question of general interest to inventors is in connection with the reissues of the Watt & Burgess patents, and on the Mellier patent, to which we confine our report.

The original Watt & Burgess patent, of August, 1853, contains the following words:

"The shavings are then to be boiled in a solution of caustic alkali, the strength of which, being dependent on the nature of the vegetable substance operated on, can be only learned by experiment. For deal or fir wood we find that a solution of alkali of the strength indicated by 12° of the English Hydrometer answers very well. The length of time necessary for this part of the process is somewhat dependent on the nature of the vegetable substance to be heated. We find boiling in a solution of caustic alkali under pressure, of considerable service. We do not claim this operation as part of our invention."

In an English patent obtained by Watt & Burgess, 1st August, 1853, their complete specification, which is dated 18th February, 1864, contains exactly the same words. In their French patent, dated 27th September, 1853, boiling in alkali is mentioned, but there is nothing whatever to indicate that this boiling should be under pressure, but it states "We have found it very advantageous to have a heating apparatus in the vats where the alkali solution is added; the pulp should be heated by steam, or other convenient method, to the boiling point."

In October, 1858, Messrs. Watt & Burgess obtained a reissue of their patent, and their specification contains the following words:

"The length of time necessary for this part of the process is somewhat dependent on the nature of the vegetable substance to be heated; that is, its resinous or gummy nature, and boiling in a solution of caustic alkali under pressure is of considerable importance. By the words 'under pressure' is meant a pressure at, near or above 300° of Fahrenheit's scale."

To the specification to the two reissued patents of 1863, the words used are substantially the same, the claim in the first (No. 1,448) being for the *product*, viz., a pulp suitable for the manufacture of paper made from wood or other vegetable substances by boiling in alkali under pressure; the claim in the second (1,449) being for the process of boiling in an alkali under pressure.

The defendants contended as to the Watt & Burgess patent (among other things), that the reissued patents of 1858 and 1863 were improperly issued, being for a substantially different invention to that described by the specification to the patent of 1854; and with regard to the Mellier patent, they alleged that as they treated bamboo and not straw, and that while Mellier claimed the employment of a pressure of seventy pounds, and a heat of 310° Fah., as the pressure used by defendant as denoted by the steam gage, never exceeded sixty pounds, they did not infringe on Mellier's patent.

It was argued by Mr. Jenckes for the complainant, and by Mr. Russell and Mr. Harding for the defendants. Mr. Jenckes contended that the reissue of the patents by the Commissioner was conclusive until reversed by a substantive proceeding for the purpose; that the inventions therein described were those really invented by Watt & Burgess, and incorrectly described in the first instance; and he very ingeniously argued that, by inserting the words "under pressure," Watt & Burgess narrowed their claim. That Burgess believed, when he took out his English patent, that he could cover the open boiling process, as well as boiling under pressure. On examination, it was found that Coupier and Mellier, in 1851, treated wood precisely in that way. His action was, therefore, exactly within the requirement of the law, that where by mistake a patentee has claimed too much in his original patent, he should surrender it and take out a narrower claim in his reissue.

The Court took time to consider, and on the 7th of January, 1868, rendered a judgment of which the substance, so far as of importance from the point offered above indicated, is:

First, that the Watt & Burgess reissued patent (No. 1,448) is void, on the ground that it is impossible to consider that to be a new material, patentable as a new product, which is simply a substance long well known to exist in wood and other substances in a state nearly pure.

Second, that the Watt & Burgess reissued patent (No. 1,449), is also void, on the ground that the process described is substantially different from any described in the original patent. And this decision, which seems sound from every point of view, serves to establish as a principle, that even though an invention be so undescribed and the evidence of actual invention at the date of application so clearly established before the Commissioner of Patents as to entitle the inventor to a reissue, that the reissued patent will be void if the invention described in it be the description of an invention essentially different from the one previously described.

Third, the Mellier patent was held to be good and a decree made in favor of complainants on the ground that the 70 pounds pressure mentioned by the inventor was evidently meant in accordance with the French method of reckoning, viz., internal pressure, from which one atmosphere has to be deducted to get at the pressure denoted on the steam gage, as was further apparent from the temperature given of 310° Fah., which, on the French scale, corresponds to 70 pounds pressure, meaning internal pressure. That, further, Mellier's description sufficiently covered the treatment of bamboo, which is of the same natural order as the wheat, oats, and other plants, to the stalks of which the term straw is usually applied.

Decree in favor of the complainants on the Mellier patent bill. Dismissed as to the others.

Rotary Ventilating Fan or Blower.

At the November meeting of the Massachusetts Institute of Technology, Mr. S P. Ruggles exhibited and explained a model of the ventilating fan or blower, invented by himself, now in practical operation at the Institute and about to be introduced into the State House in Boston.

It consists of three floats of which one remains for a short time stationary while the other two are moving, each in turn becoming stationary. The object of the stationary fan is to act as a wall to prevent the air going back, and to cause the air brought by the ascending float to pass upward through the passage which conducts it to the building. This action of the floats is produced by the shaft which carries them, being made in three parts, one within the other, each carrying a float. From the condition of rest the first float begins to move slowly, and gradually increases in speed for a quarter of a revolution, then carries the body of air at a uniform speed for half a revolution, and then decreases in speed in the last quarter of revolution to the state of rest. When the first float has completed a half revolution, the second begins to move, to follow in like manner; the third float begins to move when the first has completed its revolution, and follows in the same manner as the other two, the action of the three producing a constant and uniform current.

This movement is produced by an ingenious arrangement of wheels of irregularly oval shape producing a crank motion. The fan at the Institute is vertical, ten feet in diameter, and ten feet high; it makes about twelve revolutions per miuute, forcing out seven to eight hundred cubic feet of air at each revolution; this amount must go forward and never can go backward on account of the wall of the stationary float. It requires only about one sixth of the power required for ordinary fans of this size to move it.

Prof. Rogers alluded to the great number of rotary aspirators and blowers in use in Europe and this country, in all of which centrifugal action from rapid revolution is depended on; in the apparatus of Mr. Ruggles centrfiugal action is not the motive force, but the mass of air is drawn in below and forced or bucketed up, and delivered to the discharge pipe. The temporary stationary condition of a float in a fan blower had been used before the apparatus of Mr. Ruggles; but in fans with two floats only, in which no provision can be made against the backward flow of the air. In Mr. Ruggles' invention, the use of three floats, by the novel and ingenious arrangement of shaft and wheels, render this retrograde action impossible, as all the air drawn in can pass in no other than a forward direction, where it is required for use. K.

Preservation of Stone.

This subject, which has attracted the attention of so many chemists, seems now to have been brought to a very successful point. We have received some specimens of chalk treated by a process discovered by Messrs. Dent and Brown, of the Chemical Department, Woolwich. Their process consists in the application of a solution of oxalate of alumina to the stone. The experiments date from December, 1865, and the results they have now obtained are most encouraging. The process is applicable to limestone, dolomite, and chalk, and may, we think, be made subservient to the preparation of lithographic stone. Oxalate of alumina is readily soluble in water, and the solution, which is simply applied with a brush, is made of a strength varying with the porosity of the material to which it is to be applied. The specimens we have before us are left in the original condition at one end, and have been prepared with the solution at the other. The physical characteristics of chalk so treated are—lightness, the possession of a glazed surface approaching somewhat in appearance to marble, and greatly increased hardness; in this respect the stone is about equal to fluor spar, or 4 in Mohs' scale. Furthermore, the lime being transformed into one of the most insoluble and unalterable of its compounds, and the alumina being precipitated, the pores are filled with a substance almost unacted upon by water or by the impurities present in the atmosphere of large cities. We should be glad to hear that the discoverers had one of the experimental bays of the Houses of Parliament placed at their disposal. They might thus prove their process to be a formidable rival to that of their colleague Mr. Spiller which, according to present appearances, is likely to be the numerous schemes now *sub judice* at Westminster.—*Chemical News.*

PRIMITIVE GEOMETRY.—M. Lenormant, a member of the French Academy, has been devoting considerable attention to the study of an interesting papyrus, just added to the British Museum collection. This ancient relic contains a fragment of a treatise on geometry applied to surveying, including a description of the modes of estimating the areas of a square, a parallelogram, of various kinds of triangles, and of the computation of the area of an irregular figure by means of triangles, and of the volume of a pyramid, the whole being illustrated by appropriate diagrams. M. Lenormant, in a report to the Academy, refers the production of this papyrus to the period of the twelfth dynasty, which would be cotemporaneous with the reign of Solomon.

STEAM MAN.—A lengthy account is going the round of the newspapers of a wonderful piece of mechanism in the form of a "Steam Man," invented at Newark, N. J., by one Zaddock Deddrick. We have taken the pains to investigate the truthfulness of the wonderful story and we learn that, although an invention of the kind is in progress, it is far from being perfected; and we have the promise that as soon as the steam man is in a condition to travel we shall have an opportunity of witnessing it, and the liberty of explaining its construction and operation. In the mean time we advise our contemporaries not to get excited over the steam man for he is likely to remain harmless for the present.

ELECTRICITY IN A VACUUM.—A new apparatus for demonstrating the fact that the electric spark will not pass through a perfect vacuum has been contrived by M M. Alvergniat, of Paris. A glass tube, having inserted in it two platinum wires placed at a distance of two millimeters (three thirty-seconds of an inch) apart, is attached to a mercurial pneumatic machine. After half an hour's action the tube is heated over charcoal to a dull redness, and the vacuum continued until a point is reached when, in spite of the slight distance between the wire points, electricity ceases to pass.

HOW TO HOLD PEARLS.—It is stated that certain native artists resort to an ingenious plan for firmly securing in any desired position such pearls as they wish to drill or work upon. The gems are first fitted loosely in holes bored in a piece of soft wood. A few drops of water are then sprinkled over them, and this penetrating the fibers, causes the wood to swell and the pearl is held as in a vise, but without marring it or in any way depreciating its value. After a time the water evaporates, the fibers gradually relax, and the gem is again set free.

ABSORPTION OF GASES BY SOLIDS.—Atmospheric air by passing through india rubber, Mr. Graham, master of the British Mint, has observed, becomes super-oxygenated, and will rekindle smoldering wood like pure oxygen. He has even collected this gas by creating a vacuum in a thin india rubber bag, which latter is kept distended by mechanical means. Mr. Graham states that gases passing through solid films are first condensed into liquid form within the substance, and then pass off on the other side by evaporation.

"WASHING-DAY SPRING."—A correspondent says that "in Saline county, Missouri, is a spring, a few miles from the Missouri river, which flows freely on Fridays, but is dry on every other day, and the people thereabouts call it washing-day spring for this reason." From the above it would seem that the traditional washing-day, usually considered as following Sunday, is not recognized in Saline county. If the spring was hereaway its usefulness would be much enhanced by a change in its day of flowing.

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The Public Clocks of New York.

Mr. D. W. Bradley, City Timekeeper, lately read an interesting paper upon Tower Clocks, before the American Institute, in which were the following remarks:—

"With all due deference to the philosopher who said that time is money, I would observe that time is improvement, progress, science, art; and on the other hand it is idleness, dissipation, poverty, decay, ruin. As for its being money, let me remark that I have been experimenting with it these thirty years, and have never succeeded in making it yield more than enough to keep soul and body together. We visit St. Paul's. The bell was new a year ago. The old one got cracked, and they set a man to boring the crack out. He worked a week or two, and nearly froze to death, and when he finished his work it was found that the crack was larger than ever before. So they put in a new bell. The frame of the clock stands five feet long, two feet three inches wide, and four feet high. The pendulum is of wood, 13 feet long, giving 32 beats, and the ball weighs 75 pounds.

"St. John's clock was built by Henry Harris, London, in 1812. It is nearly similar to St. Paul's, but is better finished, and has the worst escapement I ever saw.

"The clock of the Dutch Reformed Church, Fifth avenue and Twenty ninth street, and that of St. Mark's, were made by Stokell. They are both like the clock of St. Paul's, though smaller and better. Stokell made some of the best regulators in this country.

"Trinity clock is the heaviest in America. The frame stands 9 feet long, 5 high, and 3 wide. The barrels are 20 inches, turning three times in 24 hours. The winding wheels are driven by a pinion and arbor. On the latter is placed a jack, or a wheel, a pinion, and a crank; 850 turns of the crank are required to draw up each of the weights. It takes 700 feet of 3-inch rope for the three cords; and the winding up of the weights consumes more than an hour of time, and requires the labor of two men. The pendulum is 18 feet long, and makes 25 beats. I cannot think that Mr. Rogers had a correct notion of what he was going to do when he began the building of this clock. At first it would not run 7 days, and he was obliged to put in new main wheels. The clock was at last finished, and an agreement was made with the sexton's son that he should receive 25 cents whenever it stopped, provided he at once notified the timekeeper; but as it stopped every day, and frequently three or four times a day, the expense of feeing the informer became irksome to bear, and the cumbrous timepiece was placed in new hands. By this time it had gained a poor reputation, which clings to it even in our day. The weights are 800, 1,200, and 1,500 pounds respectively, and drop 50 feet. A large box is placed at the bottom of the well, which holds about a bale of cotton waste to check the fall of a weight in case of accident. Two years ago I wound it up on Saturday, and on Sunday morning the chiming cord broke, letting the 1,500 pound weight fall a distance of 50 feet, causing much damage. The cotton box was strongly braced on all sides, but the force of the blow burst it open. The contents were well scattered, otherwise the organ bellows, just in line below, would have contracted under a pressure somewhat greater than that which the "blower" was accustomed to exert upon them. A much better clock could be built of the metal contained in the frame and main wheels of Trinity's. None of these clocks keep accurate time. Trinity does best, the clock of the Dutch Reformed Church next. During the late heavy snow storm the north window in the clock-room of St. Paul's was blown open. The snow came in, partially covered the movement, and drifted down into the box to the depth of several inches, nearly covering the ball; yet the old pendulum waded through it with the glee of a school-boy, and stowed the snow on this side and that, and pelted it with such pertinacity that by the next morning the clock was 15 minutes ahead of time. The first warm day that followed, it fainted, and stopped running. There was an old German clock on the Post Office, but it was removed a long time ago. It had but one hand. Old St. George's clock is about 50 years old. It is smaller than the others, but has gained a reputation for accuracy. Twenty years ago a person who had not St. George's time was supposed, like a busy man, to have no time at all. As it is soon to be pulled down no care is taken of its inside, and the figures on the dial are grown so rusty that the time can only be guessed at. At the City Hall we find a good clock. The pendulum, 15 feet long, vibrates in 2 seconds. The ball weighs 300 pounds. To counteract the effect of heat and cold the compensation principle has been applied to this pendulum. The contraction of the iron rods which would draw up the ball is opposed by the greater contraction of the brass bar on which the ball rests, thus letting it down. When the rods expand the greater expansion of the brass bar lets it down—only it don't—that is, not yet. I regulated it from June 1866, to February 1867, without moving the hands, but after the latter date, for three or four months, I set it every week although the variations never exceeded 30 seconds. The pendulum has not lost one vibration in more than two years. The new clock of St. George's, Sixteenth street, has never been excelled in finish. The frame is 8 feet long, 3 wide and 7 high. The main time wheel is 3 feet in diameter, has 180 teeth, turns once in 12 hours, has the figures on its face, and a pointer marking the hour. The second wheel is 27 inches, has 300 teeth, revolves every hour, and has the minutes on its face. The third wheel turns once in three minutes, and has the seconds pointed off on it. The pendulum is 35 feet long, and vibrates in three seconds, and the ball, weighing 390 pounds, is four feet in length by seven inches diameter. Two pinions and three wheels constitute all the machinary of this clock. Trinity's has five pinions and ten wheels. A duplicate of this clock is now being put up in the new arsenal at Rock Island. The clocks in the Brick Church and that in St. Therese are small but good ones, if attended to. They are cared for by the sextons, and get no care at all. A gentleman from Pennsylvania was lately telling me about his wonderful one, which did not vary 15 seconds in a year. On questioning him as to the observations he was in the habit of taking, he remarked that he took observations every day, by a noon-mark cut in the floor of his back porch. The clock of the Third-avenue Railroad depot is a fine instrument. It is exposed to a greater range of heat and cold than any other clock in the city, yet keeps excellent time."

[We gave a detailed description of the "new clock of St. George's, Sixteenth street," on page 80, Vol. XV., SCIENTIFIC AMERICAN. The finish of that clock and the beauty of its construction is probably not excelled by any in this country, whether of domestic or foreign manufacture.—EDS.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office

FOR THE WEEK ENDING JANUARY 14, 1868.

Reported Officially for the Scientific American.

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73,220.—HOLDER FOR DRYING GLUE.—William Adamson, Philadelphia, Pa.

I claim the within-described holder on which to dry glue, the said holder consisting of cords, wires, strips or sheets of suitable material saturated or coated with paraffine, or its equivalent, for the purpose specified.

73,221.—CONNECTING THE TUBES WITH THE HEADS OF SURFACE CONDENSERS.—Horatio Allen, New York city.

I claim, 1st, Making one of the tube heads of greater thickness than the other, in the manner and for the purpose herein described.

2d, Also cutting and bending into bell-mouth form tongues in the ends of the tubes, for the purpose and substantially in the manner herein described.

73,222.—HORSE HAY FORK.—D. W. Amos, Broad Top City, Pa.

I claim, 1st, The combination substantially as described of pivoted tines, A, link rods, C, and a spreading link, D, with a tripping latch and hoisting chain, B, for the purpose set forth.

2d, The arrangement as described of the link rods, C, below the joint of the tines, whereby the fork is opened by its own weight in descending.

73,223.—HORSE HAY FORK.—Lewis Atwater, Ithaca, N. Y.

I claim, 1st, The tines, C D, constructed in the form of hooks at their upper ends and branching below the said hooks to a broad bearing support near their center and to double prongs at their lower ends, all in one piece, substantially as set forth.

2d, The combination of the levers, F G, and bail, A, all constructed and operating substantially as and for the purposes set forth.

3d, The combination of the tines, C D, levers, F G, and bail, A, arranged and operating substantially as set forth.

73,224.—CULTIVATOR.—A. Bennett, Rockford, Ill. Antedated January 4, 1868.

I claim, 1st, The hitching iron, a, in combination with the plow beams, C C, and the front cross beam, D, arranged and operating substantially as and for the purposes herein described.

2d, Also the chain, h, with the stirrup, m, at one end, connected with the plow beams, C C, at the other end and passing over the rear cross beam, E, to raise the beams and shovels, as described.

3d, Also the upright hand levers, e e, hinged or pivoted to the plow beams, C C, and passing through the staples, g g, on the cross beam, E, to which they are secured by pins, k k, arranged and operating as and for the purposes described.

4th, Also the movable foot piece or steps, f, on the levers, e e, held in place by notches in the sides of the levers, as and for the purpose specified.

5th, Also the adjustable braces, p p, and slotted bolts, r r, arranged in relation with the beams, C, and standard, d, to regulate the pitch of the shovels, as herein shown and described.

73,225.—SHEEP WASH.—E. B. Booth, St. Louis, Mo.

I claim as sheep wash composed of the ingredients above named, or their equivalents.

73,226.—SAW.—E. M. Boynton, Grand Rapids, Mich.

I claim as an improvement in the construction of saws providing them with the gaging and clearing teeth, B, consisting of the inclined points, c, and the horizontal face or bearing, e, with a shoulder between the point and the bearing, e, substantially as shown and described.

73,227.—SAW TANG.—E. M. Boynton, Grand Rapids, Mich.

I claim the detachable saw tang consisting of the socket, A, with the arm, B, having the groove, n, formed in its under side in combination with the slotted bolt, D, and the thumb nut, E, substantially as described.

73,228.—SHOE HOLDER.—A. N. Breneman, Lancaster, Pa.

I claim the arrangement of the toe and heel pieces, A B, when connected by a hinge, C, in combination with the sliding wedge and band, D E, or its equivalent, for separating the parts below, substantially in the manner and for the purpose specified.

73,229.—SPIROMETER.—G. W. Brown, Rockford, Ill.

I claim, 1st, The arrangement of spirometers and index, H, and shield, I, in the manner specified and for the purpose as described herein.

2d, The metal tube, B, which rises through the water in the reservoir, A.

3d, The arrangement of the guides, E E, and eyes, F F, with spirometer, for the use and in the manner herein described and set forth.

73,230.—STRAP HOLDER.—H. W. Burgess, Ithaca, N. Y.

I claim, 1st, The construction of the strap holder when the said surfaces of the movable piece or part, B, and of the bed or opposing piece or part, A, are made to be a part or section of the volute curve, F, as figured and described.

2d, The giving by the above-named volute-shaped surfaces an adaptation to varied thickness of straps and a parallelism to each other of the said surfaces thereby safely and surely holding the varied straps placed between the grasping surfaces, as herein described.

3d, The combination of the bed piece, A, movable piece or part, B, volute-shaped surfaces, F, handle, G, and hinge, D, the same making a strap holder, as set forth as an article of manufacture.

73,231.—SHOVEL PLOW.—H. C. Chandler, Erie Township, Ind.

I claim, 1st, The notched beam at D, for the purpose of adjusting the handles to the desired hight, by a bolt passing through them and the notch.

2d, The double slotted wedge, F, and method of application at the point G, under the beam between the standards, B B, to adjust them as to width, and the slotted rods, E E securing a forward or backward movement of the standards, B B, and the shovels attached thereto, and fastened to the beam in the slots by a bolt or other similar device.

73,232.—BALANCED FEED WATER VALVE.—Geo. E. Chenoweth, Baltimore, Md.

I claim, in combination with the valve, valve-stem, and passages, an elastic, impermeable diaphragm, and air chamber underneath it, for the purpose of holding the valve in a balanced condition in any of the positions of the valve, substantially as herein described and represented.

73,233.—APPARATUS FOR DETERMINING DEVIATION OF LOCOMOTIVE CRANK PINS FROM TRUE CENTER.—Chas. J. Clifford, New Hampton, N. J.

I claim the instrument for ascertaining, without quartering or centering, whether or not crank pins on locomotive driving wheels are bent or sprung, constructed with the arms, a, feet, b, brace, c, adjusting screws and spring-marking point, fig. 2, all arranged and combined substantially as shown and specified.

73,234.—POLE ATTACHMENT.—Geo. N. Compton, Canton, O.

I claim, 1st. The combination of the part, L, with the pins, a a, and the ring, G, the whole forming the ring pieces, L G, shown in fig. 6, in the manner and for the purpose herein specified.

2d, The clevis, F, composed of the two U's, united by a hollow neck, and cast either in a single piece or in two pieces, which are connected by a bolt or rivet, in the manner and for the purposes herein specified.

3d, The tongue shield, S, with pins, a a, thereon, constructed and arranged in the manner and for the purposes herein specified.

73,235.—CORSET.—Clara Z. Cummings, Buffalo, N. Y. Antedated Dec. 28, 1867.

I claim a corset having a portion of its back formed of elastic goods, B, and provided with elastic buckle straps, C and D, for the purposes and substantially as described.

73,236.—CART HARNESS.—P. K. Curll, Elk Ridge Landing, Md.

I claim a cart harness saddle, provided with the lever, D, pivoted in the upper end of a bolt, C, said bolt being arranged to turn loosely in the cross-piece, A, all constructed and arranged to operate substantially as shown and described.

73,237.—LOOM.—John Deakin, Gloucester, N. J., assignor to himself and D. and C. Kelly, Philadelphia, Pa.

I claim the combination and arrangement of the heddle levers, pattern chain, and adjustable cams, with levers, E H, or their equivalents, the whole being constructed and operating substantially as specified.

73,238.—CIRCULAR SAW.—Henry Disston, Philadelphia, Pa.

I claim a circular saw, every tooth of which has its back edge so formed in the arc of a circle, having a center eccentric with the center of rotation of the saw, that the sharpening of each tooth may be effected by reducing the front edge in a spiral course, as herein set forth.

73,239.—SAW GUMMING MACHINE.—Thos. S. Disston (assignor to Henry Disston), Philadelphia, Pa.

I claim, 1st, The rotary cutter, G, arranged to revolve in disks, adapted to and admitting of being turned in a suitable frame secured to the saw, all substantially as described for the purpose specified.

2d, The combination of the rotary cutter, G, its bearing blocks, D D, adapted to the movable disks, B, all substantially as and for the purpose herein set forth.

3d, The rod, J, rendered adjustable on the machine, and having a notched end, adapted to the point of one of the teeth of the saw, as set forth for the purpose described.

4th, The recesses, k k, in the disks, B, for the reception of the forked end of the lever, H.

73,240.—REGULATOR FOR TIME PIECES.—Samuel F. Estell, Richmond, Ind.

I claim the combination of the regulating lever, C, having a slotted end, in combination with screw, F, and nut, E, substantially as described, and for the purpose set forth.

73,241.—AMALGAMATOR.—A. L. Fleury, New York city.

I claim the herein described amalgamator, constructed and operating substantially in the manner set forth.

73,242.—BUCKLE.—George L. Gerard (assignor to himself and David Forbes), New Haven, Conn. Antedated Dec. 28, 1867.

I claim the combination of the central bar, f, and bars, h and l, and the ribs, r and s, the whole constructed and arranged so as to operate in the manner specified.

73,243.—MACHINE FOR SCOLLOPING LEATHER.—Andrew Goodyear, Albion, Mich.

I claim, 1st, A cutting-edged disk, A, with radial corrugations or other ornamental shaped indentations formed around it on both its faces next the periphery, substantially in the manner and for the purpose herein described.

2d, The use of one or more revolving cutting disks, A, with faces shaped radially in ornamental forms, in combination with an adjustable bed roller, B, and levers, L and M, mounted in a suitable frame and arranged, adjusted, engaged, and operated substantially as and for the purposes set forth.

73,244.—NECK TIE FASTENING.—Robert A. Goodyear, New Haven, Conn. Antedated Dec. 28, 1867.

I claim the spring clasp, c, formed as shown at 1 1, for grasping the button, and so bent at or near the hinge, b, of the plate, a, that a spring is produced for keeping the plate, a, toward the clasp, as and for the purposes set forth.

73,245.—ANTI-FRICTION BEARING FOR MACHINERY.—John Harden, Chicago, Ill.

I claim the glass bearings, B, in combination with the working parts of machinery, A, flexible seat, d, arranged as set forth and for the purposes specified.

73,246.—COMPOSITION FOR PRESERVING WOOD, METAL, CANVAS, ETC.—Louis Harmyer, Cincinnati, Ohio.

I claim the composition itself, and the manner and process of compounding and using the same, substantially as herein set forth.

73,247.—AUTOMATIC ALARM FOR GRIST MILLS.—M. W. Helton and J. H. Redfield, Bloomington, Ind.

We claim, 1st, The apparatus substantially as described, and which is constructed so that when applied to mill machinery and properly adjusted thereto, it will automatically give an alarm at the proper time for changing the sacks, for the purpose set forth.

2d, In combination with alarm mechanism and devices which will automatically sound the alarm, and then be disengaged from the main driving power, substantially as shown and set forth, means, substantially as described, by which the machine can be adjusted and set to sound the alarm at any given time, for the purposes set forth.

3d, The adjustable index wheel, K, with its stop, i, and pawl, m, or their respective equivalents, in combination with the hand or arm, L, upon the shaft, b, and an alarm mechanism, operating substantially as described.

4th, The vibrating lever, D, and catch, H, in combination with the tripping wheel, E, worm-wheel shaft, C, and driving shaft, B, operating substantially as described.

5th, The pawl and clamp, m s, or their equivalents, applied to the wheel K, for holding this wheel firmly in place when properly adjusted, substantially as described.

6th, Sustaining the worm-wheel shaft, C, at one end, by means of a lever, D, in combination with a catch, H, and also with means for tripping this catch, when said shaft, C, has made a given number of revolutions, substantially as described.

73,248.—HORSE RAKE.—Benj. F. Horton, Ithaca, N. Y.

I claim, 1st. The arrangement of the teeth, and the knobs projecting from the lower sides of the thimbles, B, substantially as described.

2d, The combination and arrangement of the described levers and rods, F G H I and J, substantially as set forth.

3d, The combination of the hand lever, J, rod, I, pivoted lever, H, rod, G, lever, F, and lifting bar, E, when all are constructed and operated substantially as described.

73,249.—SODA FOUNTAIN.—John S. Hull, Cincinnati, Ohio.

I claim the soda fountain, G, tubes, H I and J, and cooler, E, combined and arranged for ejecting the water by compressed air forced into the water fountain, substantially as described.

73,250.—STEAM GENERATOR WATER GAGE.—John S. Hunter, Hartford, Conn.

I claim the arrangement of the three-way cocks, b and c, with their respective outlets, G, in combination with the tube, E, the connections, D, so as to operate substantially in the manner and for the purpose herein set forth.

73,251.—MACHINE FOR HUSKING CORN.—H. W. Knowlton, Saratoga Springs, N. Y. Antedated Jan. 1, 1868.

I claim the combination of the rollers, C D, with the elastic aprons, K, on the rollers, I L, substantially as and for the purpose set forth.

73,252.—GENERATING ILLUMINATING GAS.—Ferdinand King (assignor to himself and Charles W. Neudecher), Richmond, Va.

I claim, 1st, The method herein described of generating or producing illuminating gas.

2d, Also the compound oil herein described, for the purpose set forth.

73,253.—PUMP.—James McBride, Flint, Mich.

I claim an inclosed angular space around the pump cylinder, deriving a supply of air from the well, substantially as and for the purpose described.

73,254.—ANIMAL TRAP.—Oliver Metcalf, Salem, Ind.

I claim, 1st, The combination of a catch, a, upon a hinged door, A', with the latch rods, f, upon the revolving platforms, C, substantially as described.

2d, The hinged platform, d, held up by a spring, g, and combined with the revolving platform, C, and apron, b, substantially as described.

3d, Connecting the platform, C, to the spring shaft, c, by means of a removable key rod, h, applied substantially as described.

73,255.—PEN.—Wm. A. Morse, Philadelphia.

I claim a fountain union pen, made of two parts, a c and F, the same being adjustable, and connected, substantially as described and shown, for the purpose specified.

73,256.—HAND LOOM.—Jas. E. Nute and Geo. H. Hathorn, Lincoln, Me.

We claim, 1st, The combination with the loom frame of the pivoted arms a', warp beam, C, rod, c' and eye, d', and screw nut, e', or equivalent, securing devices, substantially as described.

2d, Combining with the treadles, H, the adjustable devices, herein described, for holding the shed pen till the reed beats up the thread, or which will allow the shed to close when the shuttle passes, when constructed and arranged to operate by means and in manner substantially as described and specified.

3d, The combination with the loom frame of the shaft, f, and spooling mechanism, substantially as described, so that the motor which drives the loom shall simultaneously operate the spooler, substantially as described.

4th, The spooler, as constructed, with the sliding serrated bar, s', slide, r', actuated by cam, z, or its equivalent, and with the pawl, t', and eye, P', arbor Y', and support, w, or their equivalents, for suspending the bobbin, all constructed and arranged to operate in manner substantially as and for the purposes specified.

73,257.—FENCE.—E F. Olds, Brighton, and Warren Clark, Green Oak, Mich.

We claim the special arrangement of the braces, C, in combination with the posts, B, when the said braces are connected to the post and to each other in manner and for the purpose substantially as described.

73,258.—BRICK MACHINE.—S. J. Parker, Ithaca, N. Y.

I claim, 1st, The perpendicular adjustable cam, C, in connection with the plungers and movable wheel, arranged and operating together as shown and described.

2d, So arranging the mold wheel, A, feed plate, E' E'' E''', and contracted feed pipe, G' G'' G''', in connection with each other, that nearly the entire surface of each brick shall be subjected to the smoothing contact of metal, as described.

3d, The arrangement of the adjustable auxiliary cam, N, in connection with the main cam, C, as and for the purposes described.

4th, The cutting wheel, X, arranged in connection with the feed pipe, G'', and feed plate, E'', as set forth.

5th, The secondary feed pipe, Z, and its side grooves, in connection with the feed pipe, G, and feed plate, E''', substantially as described.

6th, The combination of the wheel, A, on the horizontal shaft, L, adjustable cam, C, feed plates, E' E'' and E''', when substantially made, and operating as described.

7th, The combination of the wheel, A, on its shaft, L, adjustable cam, C, auxiliary cam, N, cam surface T a, plate, E', and table, H, arranged and operating substantially as described.

8th, The feed plate, E' E'' E''', when made adjustable, and arranged with reference to the mold wheel, A, substantially as shown and described.

73,259.—APPARATUS FOR THE MANUFACTURE OF STARCH.—John A. Owens, Little Falls, N. Y., assignor to himself and Henry I Petrie.

I claim, 1st, The tank, A, with the shaft and arms, A1, constructed and operating as described, and for the uses and purposes mentioned.

2d, The screen, C, constructed of the sieves, C1 and C2, and the incline

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plane, C3, substantially as described, and for the uses and purposes mentioned.

3d, Forming the front end of the sieves, C1 and C2, with the angle, C9, substantially as described, and for the uses and purposes mentioned.

4th, Forming the end of the sieves, C1 and C2, with a curve, substantially as described, and for the uses and purposes mentioned.

73,260.—FENCE.—M. D. Pratt, Copley, Ohio.

I claim the combination and relative arrangement of the stake braces, C, and short braces, D, with the rails, A, and posts, B B, in the manner herein shown and specified, the said stake braces being placed in the hollow of the angles of the fence, and alternating from side to side, as and for the purposes described.

73,261.—TEMPORARY BINDER.—N. M. Shafer, New York city.

Antedated January 2, 1868.

I claim, 1st, The series of clamps, A A, intersected by the steel bars, E, hinging on the wire, B.

2d, The movable slide, C C, and the lug or key, d, for securing the same.

3d, The back, to be used in the manner as set forth and described, in combination with the other parts.

73,262.—COMBINED LUBRICATOR AND WATER CONDUCTOR.—T. A. Shock, U. S. N., Boston, Mass.

I claim the combined lubricator and water conductor, constructed substantially as and for the purpose described.

73,263.—HAY CRANE.—Matthew Simms and Jas. V. Chambers, Wheeling, W. Va.

We claim, 1st, The application and arrangement of the guys, C C C, in their connection with the ring, b, and collar, a, and pin, c, in combination with the movable post, A, arm, A. brace, C', and lever, D, when used substantially in the manner and for the purpose as herein set forth.

2d, The arrangement of the pulleys, F F F, in combination with the post, A, and arm, B, when used substantially in the manner and for the purpose as herein set forth.

73,264.—PLOW.—Stephen T. Skinner, Jacksonville, Mo.

I claim, 1st, My forward upright frame, F, with swing bar, G, and flat chains, H H, for the use and purpose as specified and herein set forth.

2d, The attaching of my pole to the center, or near the left side of my machine, for the use and purpose as specified and herein set forth.

3d, My triple whiffletree with the triple link, x, as represented in fig. III, for the use and purpose as specified and herein set forth.

4th, My crank axles, as made, attached, and operated on my machine, for the use and purpose as specified and herein set forth.

5th, My compound regulating shaft, X, with the revolving sockets, j j, spring lever, K, and circle, L, for the use and purposes as specified and herein fully set forth.

6th, The combination of my crank axles, compound regulating shaft, X, and spring lever, for the use and purpose as specified and herein set forth.

7th, My double crank shaft, M, with lever, N, and slings, Y Y, for the use and purpose as specified and herein set forth.

73,265. —WAGON BRAKE. — James Harvey Smiley, Caroline, N. Y.

I claim, 1st, The extension of the rear axle braces, M and N, behind the rear axle, and suspension on the extremities thereof of the brake bar and brake, as described.

2d, The construction of the metallic braces, S, from beneath the rear axle braces, in front of the hind axle, to the under side of the axle, and thence to the end of the braces. M and N, where they support these braces, and give bearings for the brakes and bar, as set forth.

3d, Constructing the joint between the tongue and reach by the loop on the end of the tongue rod, and playing in the slot, D a, of the plate, D, when arranged substantially as described.

4th, Constructing the tongue rod or bar, by the long part under the tongue, held by the loop near the yoke pin, and extending thence to the rear end of the tongue, where it makes the loop, C a, and thence is continued, over the top of the tongue, to the evener of the whiffletrees, and thus binding the lower part of the bar to the upper and the tongue, by the evener bolt in its slot in the tongue, for the purpose of actuating the brake by the yoke pin, and releasing the brake by the whiffletrees, in the manner substantially as set forth.

5th, The combination of the forward and broad end of the plate, D, with the slot, D a, for the tongue and reach joint, and the slot for the king bolt, and connecting with the reach rod in the rear of the plate, as described.

6th, The combination of the bolt, E, in the holes, E E a E b, with the bolt and holes, F, for the purpose of lengthening the reach, as described.

7th, The combined whole, made substantially as described, for the purposes set forth.

73,266.—HAND LOOM.—Oliver Strong, Green Centre, Ind.

I claim the tappet wheel, E, lever, F, pawl, G, and ratchet or cloth beam, the weighted lever and arm, the same being combined in the manner and constructed as and for the purposes substantially as set forth.

73,267.—ROVING FRAME.—William H. Thompson, Biddeford, Me.

I claim the combination of a series of flexible metallic bands with the transverse rail, E, substantially as herein described, and for the purpose specified.

73,268.—SPRING BED BOTTOM.—J. D. Tifft, Cuyahoga Falls, Ohio.

I claim the combination of sections, B' C', and independent frame, D, operated by the cord and pulley, and hinged to section, C', all in the manner as and for the purpose set forth.

73,269.—MACHINE FOR POLISHING THREAD.—William W. Trapp (assignor to Tobias Kohn), Hartford, Conn.

I claim the guides around which the threads pass, arranged substantially as described, in combination with the reciprocating rubbers, so that each thread in its travel shall present two parts moving in opposite directions to the action of the rubbers, substantially as and for the purpose described.

73,270.—MACHINE FOR TWISTING WAX ENDS.—Francis K. Way, Springfield, Ohio.

I claim the arbors, D, provided with the spring clips for holding the threads, and pulleys for imparting motion, in combination with the driving pulley, C, all mounted in the frame, B, and arranged to operate substantially as and for the purpose herein set forth.

73,271.—FRUIT JAR.—E. B. Whitmore, Rochester, N. Y.

I claim the double bowed bail, C, provided with the finger places, h h, and spring bends, i k k, constructed and arranged substantially as and for the purposes set forth.

73,272.—MACHINE FOR FILLING PAINT CANS.—John Wilcox, Springfield, Mass.

I claim, 1st, The adjustable wing, q, when constructed and arranged substantially as described, and for the purpose specified.

2d, Also, the movable collar, M, in combination with the wing, q, shaft, J, and tube, a, substantially as described, and for the purpose specified.

3d, Also, the angle-box, D, when recessed as described, in combination with the tube, a, and cylinder, E, substantially as described, and for the purpose set forth.

4th, Also, the cylinder, E, when constructed with a shoulder and side aperture as described, in combination with the angle box, D, packings, c c', nut, e, and check nut, e', substantially as specified, and for the purpose set forth.

5th, Also, the packings, c c', when constructed and arranged in the manner described, and for the purpose specified.

6th, Also, the rest, G, constructed and arranged as described, and for the purpose set forth.

7th, Also, the stops, i i', in combination with the slotted rest, G, rod, h, and pin, s, as and for the purpose specified.

8th, Also, the rod, h, when provided with a pin, s, in combination with the rest, G, plunger, H, and cylinder, E, substantially as described, and for the purpose specified.

73,273.—WEIGHING SCALE.—J. D. Willoughby, Shippensburg, Pa. Antedated, December 28, 1867.

I claim the spring, i, or its equivalent, in combination with the scales, for the purpose set forth.

73,274.—SCAFFOLDING BRACKET.—John S. Wilson, Indianapolis, Ind.

I claim the bracket for scaffolding, composed of the elements, A B C, and D, constructed and arranged substantially as and for the purpose set forth.

73,275.—FRICTION MATCHES.—Benjamin F. Woodside, McDonald, Tenn.

I claim, 1st, A twine or cord, coated at intervals with igniting composition as a series of friction matches, substantially as above described.

2d, Also, such twine, in combination with a spool, or wound into a ball, substantially as specified.

3d, Also, the case, D, in combination with the continuous match, substantially as specified.

4th, Also a twine, or other suitable material, when waxed, and forming a continuous flexible taper, substantially as set forth.

73,276 —RAILROAD SNOW PLOW. — John Resco Adams, Cisco, Cal.

I claim, 1st, the dash board or share, G, and the false bottom or slide, F, operated by the hand-wheel, g, and cord or chain, g', substantially as and for the purpose specified.

2d, The bonnet or gate, E, for retaining the load upon the incline, and the hand-wheel and pins, b, pawl d, and cord or chain, b', for raising or lowering said bonnet, substantially as described; and

3d, The side pieces, D and D', movable in the ways, i i i' i', substantially as and for the purpose described.

4th, The platform, C, upon which the hand-wheels are placed, as described.

73,277.—GATE.—Ralph Adams, Ottawa, Ill.

I claim, 1st, The levers, L, and rods, R, in combination with the rack, E, substantially as shown, for the purpose of opening a gate, all as set forth.

2d, The latch bar, P, and cord, m, in combination with the levers, L, substantially as shown and for the purpose specified.

3d, The pawl, V, in combination with the levers, l and L, and notch, f, for the purpose of holding a gate open, substantially as shown.

73,278.—LAMP.—John Allen, New York City. Antedated January 4, 1868.

I claim the combination of the conical holder of the non-conducting material compartment, C, with the wick tube, B, when constructed as herein described, for the purposes set forth,

73,279.—BIT-STOCK.—Charles A. Amidon, Greenfield, Mass.

I claim, in combination with the jaws, G G, or their equivalents, constructed to move away from or toward each other in the manner described, so that they may conform to the taper of the bit shank, the screw thimble, F, or its equivalent, to force the said jaws upon said shank, as and for the purpose set forth.

The jaws, G G, constructed with the groove, formed substantially as set forth, so as to enclose the taper sides and the shoulders of the shank, as and for the purpose described.

The cavity D, formed with a bevelled orifice, as shown, in combination with the jaws, G G, constructed with correspondingly bevelled ends, as and for the purpose shown and described.

73,280 —EXHAUSTING VENTILATOR AND CHIMNEY COWL.—James W. C. Anderson, (assignor to Henry Demarest,) New York, City.

I claim, 1st, The collar or water stop, a, arranged relatively to the cone, B, and body, A, substantially as and for the purpose within set forth.

2d, Also, the within described construction and arrangement of the body, A, incline, B, connection, C and holes, D and E, as and for the purposes herein specified,

73,281.—MACHINE FOR MAKING CHEESE.—B. Armstrong, Huntsburg, Ohio.

I claim, 1st, the cylinder, E, provided with cutters, I, in combination with the mouth, K', and case, D, as and for the purpose substantially as set forth.

2d, The shell or case, D, and projection, X, constructed and arranged, in relation to the cylinder, E, and cutters, substantially as and for the purpose set forth.

3d, The ring, G, in combination with the cylinder, E, and case D, as and for the purpose set forth,

73,282 —RAILROAD RAIL.—Peter Ashcroft, Richmond Road, Dalston, and George Frederick Lee Meakin, London, England,

We claim a compound steel and wrought iron rail, in which the adjacent (or bearing) vertical surface of the steel and iron portions are formed with angular interlocking ribs and grooves, and the upper faces of the iron plates and lower faces of rail head form taper bearings, all substantially as described.

73,283.—AIR CONDENSING APPARATUS.—H. J. Bailey, Pittsburg, Pa.

I claim, 1st, the combination, with a vessel for receiving and retaining air under pressure, of two vessels for receiving air and water alternately, cooperative by means of cylinders, pistons, and pipes, for the purpose of condensing air, substantially as described

2d, In combination with the apparatus above named, an eight way cock or valve, and a three way cock or valve, substantially as shown and described.

3d, A condensing apparatus, to which air or water may be applied, for working the valves and thereby rendering the operation of the same self-acting or automatic, in the manner described.

73,284.—INKSTAND.—N. Gray Bartlett, Keokuk, Iowa.

I claim the overflow chamber, D, in combination with a fountain inkstand, substantially as herein shown and described.

73,285.—EYE GLASS AND SPECTACLE.—J. J. Bausch, Rochester, N. Y.

I claim the combination of the connecting spring, C, guards, D, and plates, E, adjustably attached to the bows, B, substantially as described and for the purpose specified.

73,286.—HARNESS ATTACHMENT.—W. W. Beebee, Dubuque, Iowa.

I claim an attachment for harnesses, substantially as and for the purpose described.

73,287.—WATER PROOF OR DAMP PROOF PAPER.—Samuel C. Bishop, (assignor to Bishop Gutta-Percha Company,) New York City.

I claim a damp proof paper, prepared with valata or balata gum or milk, in any way, substantially as herein specified.

73,288.—WATER PROOF CLOTH.—Samuel C. Bishop, (assignor to the Bishop Gutta-Perch Company,) New York City.

I claim a water proof cloth prepared with valata or balata gum, or milk applied to or used in connection with cotton in any suitable way, substantially as specified.

73,289.—PLIER.—James Bounds, Bridgeport, Conn.

I claim the adjustable jaw, d, dog, g, shanks, A B, and link, e, the whole being constructed and combined substantially as herein set forth and described.

73,290.—INSTRUMENT FOR DRAWING ELLIPSES.— Franklin Bowly, Winchester, Va.

I claim the combination and arrangement of the slotted handle, A, the marking bar, B, the sliding rods, C D, and the connecting rod, E, constructed and operating substantially as and for the purpose herein described.

73,291.—CULTIVATOR.—Jesse C. Boyd, Milroy, Ind., assignor to himself, C. P. Wilson, and L. L. Boblet.

I claim the arrangement of the beams, D, with their attachment directly to the axle, A, by means of shifting clevises, with handle, H, bar, I, and bars, F, and G, the several parts being constructed and operating substantially as and for the purpose specified.

73,292.—REFRIGERATING AND CONDENSING APPARATUS FOR PRESERVING ANIMAL AND VEGETABLE SUBSTANCES.—Edwin D. Brainard, Albany, N. Y.

I claim, 1st, the combination of the drip gutters and condensing and refrigerating troughs or condensers, forming the ceiling of a chamber, constructed and arranged substantially as described, and operating as and for the purposes herein set forth.

2d, The method of forming the condensing troughs, by uniting the sides to a cap with closed double seams, substantially as described.

73,293.—SHAFT COUPLING.—James Brayley, Buffalo, N. Y.

I claim providing the guard ring, A, with concealed recesses, g h, on its interior surface, or receiving the ends of the loose pins, e e, in combination with the holes, f, and openings, i i, of the forked heads, B, constructed and arranged substantially as and for the purposes set forth.

73,294.—APPARATUS FOR RAISING SUNKEN VESSELS.—John Burger, (assignor to himself and Albert Manvil,) Elizabethport, N. J. Antedated January 4, 1868.

I claim, 1st, the envelope, C, constructed and applied to the hull of a vessel, substantially as described, in combination with a suitable binding cable, substantially as and for the purpose specified.

2d, The construction of the binding cable, D, in two or more sections, of India rubber or like elastic material, substantially as and for the purpose specified.

3d, The frame, B, arranged upon the hull of the vessel, and in combination with the envelope, C, surrounding the same, substantially as and for the purpose specified.

4th, The supplemental sheet or wing, E, arranged in relation with the envelope, C, and the hull of the vessel, substantially as and for the purpose specified.

5th, The anchors, G, straining cables, F, and pulleys, h, arranged in relation with each other, and with the hull of the vessel, the envelope, C, and binding cable, substantially as and for the purpose specified.

73,295.—CAR-TRUCK.—Henry T. Carter, St. Louis, Mo.

I claim, 1st, a car truck, constructed as described, with braces or bars, B B', having slotted extremities connected by pins or bolts, substantially as and for the purpose set forth.

2d, In combination with the above, the sliding bar, H, rods, d d' and e, and their connections, substantially as described.

73,296.—POSTAGE STAMP.—Samuel Carusi, Washington, D.C.

I claim constructing a postage stamp, as described, with a blank space upon its face, for the purposes set forth.

73,297.—HINGE.—Samuel A. Chapman, Waterbury, Conn.

I claim, 1st, an iron hinge wrapped or covered on its edges and faces with sheet brass, substantially as described

2d, In iron hinges encased by sheet brass wrappers, burring or sinking said wrappers into the screw holes of the hinge, for the double purpose of preventing exposure of the iron, and of holding or securing the wrappers, essentially as specified.

73,298.—TWEER IRON.—Robert W. Clark, Pittsburg, Pa.

I claim, 1st, the combination of the air chamber, A, removable top, B, and keys, C C, when the same are constructed and arranged substantially as described.

2d, The combination of the air chamber, A, turning valve, E, and removable top, B, when the same are connected and arranged substantially as described.

73,299.—SEAMING AND BAG CUTTING MACHINE.—John Collins, Jr., and Nicholas R. Nixon, Richmond, Ind., assignors to N. R. Nixon, Thomas Nixon and Allan T. Bennett.

We claim, 1st, the combination of the belts, F F, G G, H H, and I, and their supporting rollers, as and for the purposes shown and described.

2d, The cutters, K K, arranged and operating between the belts, substantially in the manner and for the purpose specified.

3d, Also, a series of knives or cutters in combination with alternate double belts, substantially in the manner described, for the purpose of cutting rags into strips of any desirable width, to be woven into carpets.

73,300.— FRUIT BOX.— Ira Copeland, North Bridgewater, Mass.

I claim a box, in which the cover is secured to the body by means of one or more elastic media, arranged so as to operate substantially as described.

Also, providing a cover, when secured as described, with cross pieces on its outer surface, so that said cross pieces serve to keep apart the bottoms and tops of adjacent boxes when packed in crates, and thus permit circulation of air between the boxes, and also serve as feet for the boxes to rest upon when the cover is secured beneath the box, as in filling, or when used as a show box, and prevent injury to any marks or labels which are upon the outer surface of the cover.

Also, in combination with a box in which the cover is secured as described, and with such cover, the dowel or steady pins and holes, substantially as and for the purpose specified.

Also, in combination with elastic media, secured to the sides or ends of boxes substantially as described, cross bars, or slats, or strips of wood, or other suitable material, which serve to reduce the length and cost of the elastics.

73,301.—LOW WATER DETECTOR FOR BOILERS.—C. F. Cosfeldt, Jr., Philadelphia, Pa.

I claim, 1st, the arrangement of the levers, G H, and valve, D, constructed substantially as herein set forth.

2d, The combination of the set screw, i, with the levers, G H, and valve, D substantially as herein described.

73,302.—DEVICE FOR STRAINING WIRE FENCES.—F. H. Crandall, Ontario, N. Y.

I claim the threaded bolt, C, constructed, arranged and applied substantially in the manner and for the purposes herein set forth.

73,303.—MECHANISM FOR OPERATING SEWING MACHINES.—Gustavus Cuppers, New York city.

I claim, 1, The combination and arrangement of the shaft, a, of the spring power mechanism, with the crank shaft and connecting rods for operating the needle arm, shaft for operating the feed and hook, and brake for regulating the movement of the said parts, in the manner herein shown and set forth.

2d, The employment, in connection with the needle bar, of the movable weight or counterpoise, applied to the said bar, substantially in the manner and for the purposes described.

3d, The friction brake, constructed as herein described, and applied to the shaft for actuating the feeder and shuttle, substantially as shown and set forth.

73,304.—DEVICE FOR HOLDING BOOTS AND SHOES.—Henry T. Dillon, Big Lick, Va.

I claim, 1st, The standard, A, provided with two shanks, d d', the levers, R and O, and the hinges, h, supported by the brace, N, by means of the collar, c, as constructed, and for the purpose specified.

2d, The standard, A, in combination with the ratchet, M, and the adjustable standard, B, as and for the purpose set forth.

3d, The standard, A, when used in combination with the standard, C, and its ratchet, f, as is herein fully set forth.

73,305.—SASH STOP.—Bartlett Doe, Boston, Mass.

I claim, in combination, the hollow cylindrical bolt and the outside lever, when arranged in connection with a helical spring, substantially as and for the purpose specified.

Also, the bent wire link, b, when applied to the hollow bolt and lever, substantially as set forth.

73,306.—ORE CONCENTRATOR.—Henry Donnelly, Virginia City, Nevada.

I claim, 1st, The concave, reversible shaking tables, C C, attached to and operating upon the opposite sides of the shaft, B, together with the trough, A, substantially as and for the purpose described.

2d, The key, c, and the spring, d, together with the arms, a a' b b', loosely attached to the shaft, B, for the purpose of reversing and locking the tables, substantially as herein specified.

73,307.—SEEDING MACHINE.—P. A. Downer and A. P. Stuart, Monmouth Township, Iowa.

We claim, 1st, In a seeding machine, having a revolving cylinder, the combination of the sliding head, E, disk, e i, slide, g, lever, h, and standard, L, all arranged and operating substantially as and for the purpose described.

2n, The cleats, d', constructed and applied substantially as and for the purpose specified.

73,308.—FREIGHT CAR.—S. W. Downey, Piedmont, W. Va.

I claim the construction and arrangement of the hinged top or roof, in combination with the car, A a, and rail or rod, C, when the same are constructed and arranged substantially as described, and for the purpose specified.

73,309 —FIRE PROOF SAFE.— Ebenezer D. Draper, Hopedale, and Edward W. Glover, Medford, Mass.

We claim the combination and arrangement of a heat non-conductor, c, of mica or its equivalent, with each or either of the metallic jambs or sides of the door frame, and the filling thereof, the whole being substantially as and for the purpose specified.

Also, the combination and arrangement of one or more strata of fusible metal, d, with the mica or heat non conductor, c, arranged in a safe, substantially in manner and for the purpose specified.

Also, the combination and arrangement of mica, or its equivalent, or of mica and fusible metal, with the sides of the burglar proof and the next adjacent internal surfaces of the safe, the whole being substantially as specified.

73,310.—CARPET STRETCHER.—A. L. Dunbar, Sheldon, Ill.

I claim the carpet strercher, constructed as described, consisting of the sections, B, of equal length, pivoted together, said stretcher provided at each end with a toothed head, whereby the carpet can be stretched to be nailed down upon two sides of the room at once, without removing the stretcher, as herein shown and described.

73,311 —SAFETY PLUG FOR BOILERS.—Theodor G. Eiswald, Providence, R. I.

I claim fusible plugs, constructed substantially as shown and described.

73,312.—GATE.—Lewis Essig, Canton, Ohio.

I claim, 1st, The opening and closing of any farm or other gate, A, by means of the windlasses, b, and ropes, H, H1 and H2, substantially as shown and described.

2d, The windlasses, b, and the ropes or chains, H, H1 and H2, and the pulleys, E and E', in combination with each other, and in combination with the posts, G, and the post, B, and any gate, A, substantially as shown and described, and for the purposes set forth.

3d, The slotted cap, e, in combination with the gate, A, substantially as shown and described, and for the purposes set forth.

73,313.—PORTABLE SHADE AND SEAT.—Dana Estes, Newton, assignor to himself and Casper W. Roeth, Boston, Mass. Antedated Jan. 3, 1868.

I claim the combination of the adjustable rail, C, and the posts, B B, provided with notches, a, as set forth, with the settee or seat, A, and the awning, D, applied thereto, by means and so as to operate as specified.

73,314.—HARVESTER —D. S. Fisher, Cedar Spring, Ind.

I claim, 1st, The combination of the caster wheel, C, pivoted adjustable standard, a, pivoted arm, b, pivoted bar, d, and perforated horizontal segment plates, D, whereby the rear end of the frame and cutters is raised and lowered, and the direction of the harvester changed, as herein shown and described.

2d, The combination of the projection, a x, grooved wheel, l, spring, m, lever, T, pendent arm, U, crank, m x, shaft, V, rod, p, arm, q, rod, W, and finger, n, as herein described, for the purpose specified.

3d, The combination of the pivoted shaft, M, frame, L, and lever, Q, with the vibrating arm, N, having the pivoted head, O, and rollers, P, the lever, K, and connecting rods, J, all constructed and arranged as described, whereby the vibrating arm is thrown in and out of gear with the driving wheel, B, as herein shown and described, for the purpose specified.

73,315.—BAGGAGE CHECK.—Edward Flather, Bridgeport, Ct.

I claim the indicator arm, C, revolving on the set screw or rivet, D, and their equivalents, in combination with the disk, A B, substantially as herein set forth and described.

73,316.—PUMP.—Robert M. Fryer, New York city, assignor to Universal Pump and Manufacturing Company.

I claim, 1st, The vertical chambers, D D', having sediment chambers, E E', vertical cylindrical chambers, P P', with conical tops, U U', and diaphragm chambers, F F', in combination with a horizontal cylinder, A, arranged as described, and operating in the manner set forth.

2d, The arrangement of the valve chambers, S', T and K, in their relative positions one to the other, to operate substantially as specified.

73,317.—THILL COUPLING.—W. W. Goff, Avoca, N. Y.

I claim the bolt, A, sliding hook, B, and India rubber ring or spring, when combined substantially as and for the purposes set forth.

73,318.—METHOD OF STOPPING CREVASSES.—Louis A. Gossin. Parish Lafourche, La.

I claim the construction and arrangement of the boat, A, and piles, F, in the manner and for the purpose substantially as herein set forth.

73,319.—POTATO DIGGER.—John H. Gray and Charles W, Calhoun, Florence Township, Michigan.

We claim the construction of the machine, with the inner frame, b b, hinged to the front end, with the scoop attached, in combination with the other devices, as shown and described.

73,320.—ELASTIC COUPLING FOR SEEDING MACHINES, ETC.—A. P. Green, Stueben, Ohio.

I claim, 1st, The shank, C, provided with shouldered collars, D, in combination with the ring, E, elastic filling or ball, F, in the manner and for the purpose set forth.

2d, The thimble or sleeve, G, arms, H, in combination with the ring, I, washer, J, and elastic filling, F', in the manner and for the purpose substantially as set forth.

73,321.—BARREL HEADING, CIRCLING, AND BEVELING MACHINE.—Remig Grotz, Chicago, Ill.

I claim, 1st, The frames, J, with their clamping devices mounted on the central pivot, D, and the operating devices, so arranged that as one is moved to the saw the other shall move from it, substantially as described.

2d, The pivoted sleeve, D, provited with the slotted arms, F, for supporting and adjusting the frames, J, as described.

3d, The adjustable locking levers, p, arranged to operate as described, for the purpose of holding the frames in position, as set forth.

4th, The clamps, M, having the adjustable segments, O, with the springs, k, applied to plates, P, in combination with the square mandrel, h, with the spring, i, and cam lever, N, applied thereto, all mounted on the arm, I, of the swinging frames, J, when arranged to operate substantially as described.

73,322.—SOLUTION FOR TREATING VEGETABLE FIBER FOR THE MANUFACTURE OF VEGETABLE PARCHMENT.—Stuart Gwynn, New York city.

I claim the mode of producing the fluids numbered (1) one and (2) two, substantially as described, to be used consecutively in transforming cellulose into "vegetable membrane."

Also, fluid number one, produced substantially as described, as a "new composition of matter."

Also, fluid number two, produced substantially as described, as a "new composition of matter."

Also, the use of these fluids, produced substantially as described, in combination with machinery and apparatus, hereafter to be patented, for manufacturing cellulose, in the form of "vegetable felts," into a "new composition of matter," to be patented under the name of "vegetable membrane."

73,323.—CORN SHELLER.—J. R. Hamilton, Portland, Oregon.

I claim, 1st, The apparatus, as constructed, with a series of rowers, a a a, arranged in a circle, also the scrapers, f f f, in the rear of the rowers, substantially as and for the purpose herein set forth.

2d, The rowers, as arranged alternately, the one forward of another, the same being pressed by springs toward the center, so as to act as a wedge, parallel with, between, and under the rows of corn.

3d, The sliding plunger, H, to push ears of corn between and through bars a a a a, with the rowers or points, b b, attached either vertically or horizontally, as and for the purposes herein set forth.

73,324.—LAMP CHIMNEY CLEANER.—Jonathan R. Hamilton Portland, Oregon.

I claim, 1st, The scrubbers or wipers, A A' and C C, when constructed and applied so as to operate substantially in the manner as and for the purposes herein set forth,

Also, the wiper, as constructed, in combination with the gear mechanism for operating the same, as specified.

73,325.—WINDOW SASH FASTENER.—John W. Hansel, Peoria, Ill.

I claim the combination of the weight, A, on the bolt, B, with the arm, C, on the lever, D, operating together substantially as and for the purpose herein specified.

Also, one or more spurs, s s, on the upper edge of the bolt, B, in combination with its mortises in the window frame, with the said weighted bolt and the fluted lever, D, operating substantially as described.

73,326 — STEAM COMPRESSER FOR VULCANIZING FLASKS.—Geo. E. Hayes (assignor to Buffalo Dental Manufacturing Company), Buffalo, N. Y.

I claim, 1st, The process, substantially as herein described, of closing the flasks under pressure of steam or vapor, during the operation of vulcanizing the rubber in the molds, by means of a steam ram or compresser connected with the flasks by a clamp or otherwise, and having the heat necessary to effect vulcanization transmitted through it in such manner as that the steam which is thus derived from a vessel that is distinct from the vulcanizer, though arranged within the latter, operates to close the flasks in advance of outside steam pressure on the latter, and while the rubber is at a comparatively low temperature, and plastic, essentially as herein set forth.

2d, The steam compresser composed of cylinders, A and B, in combination with a suitable clamp for holding the flask sections in connection therewith, substantially as specified.

73,327.—CHURN.—A. J. Heavner, Time, Ill.

I claim, 1st. The double dasher consisting of the parts, D E, constructed and arranged substantially as described to work one within and through the other, as specified.

2d, Also the double dasher consisting of the parts, D E, operated by the double crank, G H, through the medium of the connecting rods, F I, substantially as described and specified.

73,328.—BOOT HEEL.—Gottlieb Henning and Herman P. Willie, Buffalo, N. Y.

We claim a boot heel consisting of the embedded skeleton frame, A, provided with the flanges on the rim, c, fixed screw, e, and rubber, g, constructed and arranged substantially as set forth.

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73,329.—WAGON JACK.—Nicholas W. Hess and Jacob H. Fry, Fort Wayne, Ind.

We claim the lever, A, the concavo-convex or crescent-shaped step or link, B, in combination with the convex surface of the stud or litter, C, the same being constructed in the manner and for the purpose described.

73,330.—IMPLEMENT FOR DRAWING NAILS.—Henry W. Holly, Norwich, Conn.

I claim the jaws, A A, constructed to open and close as described and with their upper ends or arms having converging sides, g, forming an opening, f, between them so that by lifting on the same through a lever inserted as specified to extract the nail the grip of the nippers is tightened on the latter, in the manner substantially as set forth.

73,331.—IMPLEMENT FOR DYERS AND BLEACHERS.—H. W. Holly, Norwich, Conn.

I claim the forked implement having the extremities of its tines knobbed or enlarged, substantially as herein set forth for the purpose specified.

73,332.—DRY GAS METER.—T. C. Hopper, Philadelphia, Pa.

I claim, 1st, Producing both of the channels, a' a'', on the same side of the partition, A, substantially as and for the purposes described.

2d, In the valve seat, B', the annular channel, b''', in combination with the closed center and narrow-faced dividing partitions, b'' b'', of the four openings which are surrounded by the said annular channel, b3, substantially as and for the purposes described.

3d, Casting the seat, B', of the valve and the projecting portion, b'', thereof in one piece so that both of the channels, a' a'', can thereby be produced exclusively on one side of the partition, A, substantially as described and for the purposes specified.

4th, In the rotary disk, B, of a gas meter the outlet, 3, in combination with the space above the faces, 2 2, and the annular channel, 4, arranged substantially in the manner described and shown for the purposes specified.

5th, Passing the spindle, C, loosely through the rotary disk, B, and giving it a bearing in the seat, D', substantially as and for the purpose described.

6th, Giving rotary motion to the disk, B, upon the seat, B', by means of the cross bar, c'', fixed in the spindle, C, in combination with the studs, c'' c''', fixed in the said disk, B, when the spindle, C, passes loosely through B', substantially as and for the purpose described.

7th, Arranging the packing box, F, of the spindle, C, in the top of the valve cover, E, in the position shown as below the worm wheel for the purpose of admitting of the "repacking" as occasion may require without removing the king post, G, as described.

73,333.—CUPOLA FURNACE.—John Howarth, Salem, Mass.

I claim in combination with a cupola, blast or other furnace (in which combined air and steam are used as described) the superheater chamber located directly over the furnace, substantially as described.

Also the superheater base, f, and its upright return bends, g, combined and arranged together and relatively to the furnace and air blast, substantially as shown and described.

73,334.—LOCKING KNOB LATCH.—W. L. Imlay, Philadelphia, Pa.

I claim, 1st, Constructing the key bolt, B, with a projection, F, for the purpose of locking and unlocking the knob latch, A, by means of its described action in the slot of the knob latch, as set forth.

2d, The constructing and arranging of the knob latch, A, with the surface, a (for the action of the key), and the slot in its inmost end for the purpose of giving the knob latch a dead latch action and for the purpose of conjoined locking with the key bolt, B, thus making the latch, A, subserve any one or all of the three uses, as follows: of a simple knob latch, a dead or night latch and an additional security to the key bolt, B, as set forth.

73,335.—HYDROCARBON BURNER.—W. L. Imlay, Philadelphia, Pa.

I claim, 1st, The construction of the vapor and gas chamber, B, with two walls the outer one of any suitable form and the inner one cone shaped or inclined inward, and operating substantially as set forth.

2d, The construction of the blast-equalizing chamber, E, larger than the flow pipe, D, and with the inclined apertures or escape, F, arranged just beneath or just within the lower part of the generator, as set forth.

3d, An apparatus for burning hydrocarbons constructed and made of the pipe, A, from the reservoir, the chamber, B, flame blast aperture, G, tube, D, receiver, E, and escape apertures, F, operating substantially as set forth.

73,336.—SEEDER AND CULTIVATOR COMBINED.—A. Ingalls, Independence, Iowa.

I claim, 1st, The slide, G, as arranged in combination with the lever, H, and adjusting rod, I, for the purpose and in the manner as set forth.

2d, The graduating scale, F', in combination with the adjusting rod, I, for the purpose and in the manner as set forth.

3d, The foot board, Q, and swing bar, O, as arranged in combination with the cultivators, N, for the purpose specified.

73,337.—CARD AND CRIBBAGE BOARD.—R. S. Jennings, Philadelphia, Pa.

I claim a card board constructed as described and so arranged as to be used for playing thereon the ordinary games of cards or the game of cribbage.

73,338.—SWAGE FOR SAW TEETH.—Nelson Johnson, Jasper, N. Y.

I claim, 1st, The provision of notches or teeth, a, on the swage stock to hold the notched or serrated saw tooth against displacement, substantially as described.

2d, The adjustable swage pin or die, B, or its described equivalent, whereby the swage is made to accommodate or adapt itself to irregularities or variations in the saw teeth, substantially as described.

3d, A reversible supporting die or swage pin, B, having a convex or oval face in order to either spread the tooth sideways or draw the same endways, substantially as described.

4th, The die or stamping device, C, in combination with the spring holder, C1, and adjusting screw, C2, substantially as and for the purpose set forth.

73,339.—MACHINE FOR POINTING PICKETS.—W. W. Johnson, Nashville, Tenn

I claim the swinging arm, D, provided with the eccentric lever, F, and the holding clamp, E, when constructed and arranged to operate the picket against the knife, a, substantially as and for the purpose herein described.

73,340.—AXLE FOR WAGONS.—Daniel Jones, San Francisco, Cal.

I claim the countersunk collar, C, either in combination with the strap, D, or, where used alone, constructed and arranged substantially as and for the purpose described.

73,341.—SAW FRAME.—Moses J. Jones, Fredonia, N. Y.

I claim the saw frame, A B, constructed as described and used for the purposes set forth.

73,342.—EXPANDING WHEEL HUB.—A. I. Judge, Baltimore, Md.

I claim, 1st, An adjustable base with an inclined face against which the ends of the several spokes of the wheel bear so arranged that the spokes may be simultaneously more or less extended through the hub by changing the position of the inclined base, substantially as and for the purpose set forth.

2d, Also in combination with a chambered hub the conical base, B, and adjusting screws, A, substantially as and for the purpose set forth.

73,343.—SHINGLE MACHINE.—Edmund Keith, Buffalo, N. Y.

I claim, 1st, The sliding bar, P, and frame, Q, provided with inclined arms, q q, arranged and operating the pivoted tilting frame, N, substantially as set forth.

2d, Also the concentrically grooved wheel, H, in combination with the bar, P, grooves, u t, d 2g, c', with projections, d', and pin' v, all constructed and operating substantially as described.

3d, Also the sliding spring jaw or clamp, F, in combination with the lever, E, and eccentric, G, for alternately operating to release and hold the bolts, all constructed and arranged substantially as set forth.

73,344.—CLAMP FOR FILING SAWS.—Christian Kendig, Safe Harbor, Pa. Antedated January 2, 1868.

I claim the bed pieces, A and A', when provided with the screws, e e, the face block, B, provided with the screw, f, the jaws, C C', and the clamps, D D', arranged substantially as described and set forth.

73,345.—STREAM OR RIVER FENCE.—H. A. Kephart, Fletcher, Ohio.

I claim the sill pieces, A A, secured in position as shown, or in any equivalent way, and having the slats, B, attached in connection with the counterpoised slats, D, arranged substantially in the manner as and for the purpose specified.

73,346.—SCAFFOLD FOR BUILDING.—James Lamb, Aurora, and Francis Livings, East Enterprise, Ind.

We claim the horizontal bar, B, notched near its inner end, provided with diagonal braces, D D, and vertical bars, f f, bolted together as described between which are passed the shore timbers, C, connecting into the notch in bar, B, for supporting one end of the platform, A, all constructed and used as specified.

73,347.—COFFEE MILL.—W. J. Lane (assignor to himself and J. G. Lane) Washington, N. Y.

I claim the external shell or cone, D, of a coffee mill of the class described when provided with the pendent flange, a, surrounding the conical grinder, E, for the purpose of giving a downward direction to the ground coffee and preventing it from being scattered about in the mill, as herein shown and described.

73,348.—THRESHING MACHINE AND GRAIN SEPARATOR.—Levi B. Lathrop, San José, Cal.

I claim, 1st, The device for imparting the peculiar motion as herein described to the screen, E, said device consisting of the inclined guides, C, arm, G, and crank shaft, H, or their respective equivalents.

2d, Providing a screen, E, with alternate depressions and elevations similar to waves, substantially as and for the purposes herein shown and described.

3d, The packing, e, when arranged at the sides of the frame of the screen, substantially as and for the purposes herein shown and described.

4th, Passing the grain by any suitable conveyor directly under the end of a suction pipe, as set forth.

5th, The screen, E when arranged and operated as set forth in combination with the suction tube, I, the same being arranged substantially as described.

6th, The tossing motion of the screen, E, when applied to the purpose of separating grain from straw or for separating it from chaff or for simply conveying light articles, substansially as described.

73,349.—FASTENING FOR WIRE FENCES.—W. E. Lockwood, Philadelphia, Pa.

I claim the pulley, D, its many-sided projection, d, when the said pulley is arranged to turn in the brackets, B and B', or their equivalent, and is confined by a key, E, all substantially as and for the purpose herein set forth.

73,350.—APPARATUS FOR DRYING ENVELOPES.—William F. Lockwood, Philadelphia, Pa.

I claim, 1st, Two sets of endless tapes or bands in combination with a train of pulleys, arranged substantially as described for the purpose specified.

2d, The combination of the narrow pulleys, C C', with the broader pulleys, D, and the two sets of bands, for the purpose specified.

73,351.—CARTRIDGE EXTRACTOR.—Horace Lord, Hartford, Conn.

I claim discharging or throwing out the empty cartridge (after it has been extracted from the charge chamber) by means of a vibratory or lifting lever or hammer arranged to strike the case, substantially as described.

73,352.—BERRY BOX.—Truman Mabbett, Jr., Vineland, N. J.

I claim a box for berries and other small fruit, constructed of two upright end pieces, A A, and a body B, of semicircular form in its transverse section, and secured to the end pieces as shown, the body and end pieces being perforated or not, as desired, substantially as herein shown and described.

73,353.—LET-OFF FOR LOOMS.—J. A. Marden, Chelsea, Mass.

I claim, 1st, The combination of parts, D F and E, with parts, C and H, constructed, arranged, and operating substantially as described.

2d, The double friction brake, e e', operating upon the periphery of the wheel, C, and actuated by means of spring, H, and the whip roll and lever, D F, and yarn, G, substantially as described.

3d, The above in combination with a take-up mechanism, substantially as described.

73,354.—MILL SHAPE OR MOLD FOR MANUFACTURING TOBACCO.—Grandison F. Marks, Petersburg, Va.

I claim the iron plate, A, or other metal, of suitable thickness, and securing the same to the followers or sinkers, B B, and the plates, e e e, with strong rivets, C C C, for the construction of mill shapes or molds for manufacturing tobacco, substantially as herein set forth.

73,355.—REFLECTOR.—Wm. M. Marshall, Philadelphia, Pa.

I claim, 1st, The flexible base, B, of pasteboard, papier maché, wood, or sheet metal, in combination with the silvered strips of glass, A A, the metal frame, C C, and the curved wire mesh work, D D D, and the metal clasps, F F F and H H H, substantially as described.

2d, The wire frame, C C, the curved wire mesh work, D D D, and the metal clasps, F F F, in combination with the glass plates, A A A, and the base, B, when arranged together so as to form a reflector or section of a reflector, substantially as described and for the purpose set forth.

73,356.—GRAIN TESTER.—B. Martin, Prairie du Chien, Wis.

I claim 1st, The grain tester, with the scale, c c', graduated 61 degrees downward, as described, and with a straight edge, r r', upon one side, for the purpose of leveling the grain in the bucket, P, as herein shown and described.

2d, The combination of the spring, L, rod, m, and bucket, P, with the index finger, H, and scale, c c', as herein described and for the purpose specified.

73,357.—BREECH-LOADING FIRE-ARM.—James E. McBeth (assignor to himself and Sheldon Sturgeon), New Orleans, La.

I claim the close hinged box, D, in which are completely incased the lock and cock, and which is held in position by means of the spring dog, I, as and for the purposes specified.

73,358.—LOCK CATCH AND STOPPER.—Edgar P. McCeney, Washington county, D. C.

I claim so combining and arranging a bent lever, b, a slide bolt, c, with a frame, a, in the manner substantially as and for the purposes set forth.

72,359.—ELASTIC PRINTING APPARATUS.—James McDermott, Frederick, Md.

I claim, 1st, The arrangement of the frame, A, movable bottom, B, set screws, H, vokes, E, and adjustable types, substantially as described.

2d, The concave roller, I, shaft, K, reciprocating frame, J, guide grooves, O k, lugs, j, frame, A, and inking apparatus, m m' n, when combined and arranged in the manner described.

73,360.—WINDLASS.—Wm. G. McIvor, Liverpool, England.

I claim the application of strings to a windlass to operate in the manner substantially as and for the purpose specified.

73,361.—ASH SIFTER.—Joseph A. Miller, New York city.

I claim the combination in a box or case, of the upper and lower chambers A B, grate, C D, the one portion, D, of which inclines upward, and sluice or grate, for cleansing ashes or cinders by a water process, essentially as herein set forth,

73,362.—APPARATUS FOR SINGEING COTTON CLOTH.—Joseph A. Miller, New York city.

I claim, 1st, In combination with a rotating singeing body, or surface, the reflector, E, substantially as described.

2d, The combination of a damper, F, with a rotating singeing body or surface, essentially as specified,

73,363.—STEAM GENERATOR.—J. A. Miller, Providence, R. I.

I claim, 1st, The combination of the fire dome, F, with the fire chamber, C, and tubes, G J, arranged and operating essentially as herein set forth.

2d, The arrangement of the valves, H, within the smoke box, for controlling the central or fire dome flues, substantially as shown and described.

72,364.—STEAM GENERATOR.—J. A. Miller, Providence, R. I.

I claim, 1st, The combination of the tubes, C and E, with the shields, D, crown sheets, c, and lower sheets, d, substantially as specified.

2d, The combination of the shields, D, with the sediment tubes, E, and outer tubes, C, essentially as herein set forth.

73,365.—COMBINED DRILL, ROLLER, AND CULTIVATOR.—T. S. Mills, Kendallsville, Ind.

I claim, 1st, Constructing the frame of the machine of two parts, A A, connected by joints, a, and each part provided with a roller, B, when said parts, thus constructed and arranged, are used in combination with a seed dropping apparatus for planting seed either in hills or drills.

2d, The operating of the toothed wheels, G, from one of the rollers, B, through the medium of the gearing, J M, pitman, I, connected with bar, K, and with crank pulley, H, on one of the shafts, F, of the wheels, G, all arranged substantially as and for the purpose set forth.

3d, The bar, O, attached centrally and longitudinally to the frame at its rear end, and provided at its front end with a caster wheel, P, in connection with the wheel K, and strap, l, or their equivalents, for raising and lowering the front part of the machine, as set forth.

4th, Operating the seed distributing wheels, U, through the medium of the toothed segment, W, at the lower end of the bentlever, X, and the pinion Y, on one of the shafts, F, substantially as and for the purpose specified.

73,366.—STAMP MILL.—Geo. R. Mitchell, Nevada, Colorado.

I claim, 1st, The bearing, D, having the lower portion enlarged, forming a water chamber, a, substantially as described.

2d, In combination with the above and with the stem, B, of stamp, a, the water supply pipe, H, tube, F, stop cock, G, and flexible hose, E, substantially as described and for the purpose specified.

73,367.—MANUFACTURE OF ARGAND GAS BURNERS.—George Mooney (assignor to himself, Job Arnold, and James Shaw, Jr.), Providence R. I.

I claim, 1st, Forming an argand gas burner of one piece of metal, substantially as described.

2d, Forming the gas jet apertures through the top or rim of the burner without drilling, and substantially as described.

3d, The screw, f, forming a nadjustable check, in combination with an argand burner, for the purpose of producing a still light, as herein shown and described.

73,368.—HORSE COLLAR.—Thomas Moore, New York city.

I claim forming a horse collar with one outside and one inside leather piece joined together at the sides, with two seams only, and bent around continuously at the bottom, so as to make a collar with a whole throat, having no cross seam, arranged substantially as herein described.

73,369.—EYE MEDICINE.—D. R. Morgan, San Francisco, Cal.

I claim the above described composition for treating the eyes, made of the ingredients enumerated, mixed or compounded in about the proportions specified.

73,370.—CORK EXTRACTOR.—Jas. Morton, Philadelphia, Pa.

I claim a double lever cork extractor consisting of the bars, A C and D, all made and operating substantially as herein shown and described.

73,371.—SPINNING MACHINE.—Robt. Moxley, Muscatine, O.

I claim, 1st, The combination and arrangement of the shaft, a''', belts, a a' shafts, F F', brake, T, treadles for tightening the belts, a a', belt, c, and carriage, C, all the said parts being constructed and operating together substantially in the manner and for the purposes specified.

2d The arrangement of the said parts with the belts, b and d, wheel, D, apron, J, faller, I, slide, L, set screw, l, inclines, g g, and gate, G, the whole constituting a combined hand roll and twisting machine, substantially as described.

3d, The adjustable apparatus for indicating the twist, consisting of the slide O, belt, u, knot, o', lever, v, and bell, W, all arranged and operating substantially as and for the purpose set forth.

73,372.—LAMP.—George Neilson, Boston, Mass.

I claim in combination with the tops of lamps for using burning fluids, an annular cork packing, made, arranged, located, and held in position in the lamp, in the manner and for the purpose herein described and represented.

73,373.—APPLE SLICER.—H. Norton and J. S. B. Norton, Farmington, Me.

We claim the combination as well as the arrangement of the corer, K, with the knives, L L' and H H' H'', substantially as described and for the purpose set forth.

73,374.—LOOM.—Benjamin Oldfield and Edwin Oldfield, Newark, N. J. Antedated Jan. 4, 1868.

We claim, 1st, The combination of a brake, c2 or d, with the tension spring c, reel, R, and shuttle, S, substantially as and for the purpose set forth.

2d, The spring catch or bridge piece, d, in combination with the shuttle, S, and reel, R, constructed and operating substantially as and for the purpose described.

3d, The loose peg, f, in combination with the shuttle carriers, C, guide bars, h, cams, g, and shuttle, S, constructed and operating substantially as and for the purpose set forth.

4th, The arrangement of slide bars, D, moving on the top of the batten, in a straight line, without rise and fall, having uprights attached thereto with holes in to receive a loose peg or stud capable of carrying a shuttle, each peg or stud receiving motion by a cam or its equivalent, substantially as and for the purpose set forth.

5th, The arrangement of cams, F, attached to or formed by the cog wheels E, in combination with stops, k, on the slide bars, D, substantially as and for the purpose described.

6th, The arrangement of a cam, n, and eccentric, t, attached to and operated by the shaft that carries the shuttle actuating devices, and in combination therewith, the spring stop, s, bar, E', and belt shipper, H, constructed and operating substantially as and for the purpose set forth.

7th, The arrangement of a brake, G, in combination with the stop motion and shuttle motion, constructed and operating substantially as and for the purpose described.

8th, Operating the harness by chains and chain wheels, N, and levers, L M, substantially as and for the purpose set forth.

9th, A harness motion composed of loose arms, L, each of which is pivoted at one end to a lever, M, and at the opposite end to a circular or segmental chain wheel, N, substantially as and for the purpose described.

10th, The vibrators, j', in combination with the rollers, i', carrying the hooks l', and with the intervening hinge, O, and pattern chain, Q, constructed and operating substantially as and for the purpose set forth.

11th, The arrangement of elastic springs or cushions under the pins or studs of the pattern chain, in combination with the T-headed shanks of said pins or studs, and with suitable ridges or cavities on the inner surfaces of the several leaves of the pattern chain, substantially as and for the purpose described.

73,375.—COMBINING COPPER AND CAST STEEL.—James Park, Jr., Pittsburg, Pa.

I claim combining copper and cast steel by heating the copper to a good red heat, and teeming or pouring thereon liquid molten cast steel, substantially as and for the purposes hereinbefore described.

73,376.—KEEL AND BILGE BLOCK.—J. T. Parlour, Brooklyn, N. Y., assignor to himself and William Beard.

I claim, 1st, The combination, with the blocks, B C D, and side pieces, E F, of the chains, G K, pulleys, M I L, ratchet wheel, Q, and pawl, R, all constructed, arranged, and operating substantially as described.

2d, The side strips to the supporting or cap piece of a bilge or keel block, substantially as and for the purpose specified.

73,377.—FINISH FOR PAINTED SURFACES.—H. T. Payne and Wm. Ayres, San Francisco, Cal.

We claim a finisher for paint, consisting of crude galena, prepared and applied substantially as and for the purpose herein described.

73,378.—CASE FOR UMBRELLA.—S. H. Pearce, Boston, Mass.

I claim an umbrella-case composed of enamelled cloth, the parts of which are secured together by cement, substantially as described.

73,379.—MECHANICAL TOY.—H. G. Pearson, New York city.

I claim, 1st, A mechanical toy, the positive motions of whose parts are derived from a crank or cranks on the axis or revolving hoop.

2d, Also, the combination, with such a crank or cranks, of a system or systems of connecting links, substantially as shown and described.

3d, Also, in combination, a revolving hoop, carrying a suspended image or toy, which does not revolve, but whose members are given positive and determined movements, substantially as described.

4th, Also, the combination, with the rooling hoop of a mechanical toy, of a radial arm, projecting from the hoop toward its center, as and for the purpose set forth.

5th, Also, the combination, with such a hoop and radial arm, of a jointed image

73,380.—DROPPING PLATFORM FOR HARVESTER.—G. M. Peters, Lancaster, Ohio.

I claim, 1st, A slatted dropping platform adapted to turn upon a pivot located at its inner front corner, and to tilt or drop upon a hinge or fulcrum supports arranged in a line parallel with the finger bar, substantially as described.

2d, The semicircular plate, E, provided with the incline or offset, e' in combination with the quadrant plate, or its equivalent, attached to the platform, and operating substantially as described.

3d, The slatted platform, pivoted at its inner front corner, in combination with the plates, E and F, or their equivalents, substantially as described.

4th, The dropping platform, pivoted at its inner front corner, in combination with the forked lever, J, and cam wheel, K, substantially as described.

5th, The combination of the turning and dropping platform, with the cut-off, M, in the manner substantially as described, whereby the cut-off is operated by the same lever which throws into gear the mechanism operating the platform, as set forth.

73,381.—VALVE FOR STEAM ENGINE.—Wm. G. Pike, Philadelphia, Pa.

I claim, 1st, The steam supply chest and supply-valves, B, and their stem, E, in combination with the two exhaust valve boxes, N N, exhaust pipes, O O1, terminating in a single pipe, O2, exhaust valves, J J', and their stem, all arranged and operating in the manner and for the purpose substantially as set forth.

2d, Also, arranging the exhaust valves, J J', below the exhaust valve box covers, K K', so that said valves move upon and against the under side of said covers, substantially as set forth.

73,382.—SEPARATOR.—J. F. Pool, Monroe, Wis.

I claim, 1st, The thumb screws, P and W, when operating to adjust the screens, m and n, in the manner described.

2d, The screw, X, in connection with a roller, y, for regulating the hopper-screen and hopper, as herein set forth.

3d, The bar, F, furnished with plates, g and e, in combination with shaft, H, plate, K, and hooks, s, the whole constructed substantially as set forth.

73,383.—BOXED HONE.—Joseph Potter and Oliff Abell, Whitehall, N. Y.

We claim, as a new article of manufacture, the circular hone encased in a circular wooden box, having wooden cover, C, in such a manner as to protect the hone and keep its upper surface level, or from having depressions formed therein by the action of the tool being ground, as herein shown and described.

73,384.—ANIMAL TRAP.—Samuel Reed, Whitestown, Pa.

I claim the combination of the hinged vestibule, A, and trap, B, constructed and arranged substantially as and for the purpose herein specified.

73,385.—CAR COUPLING.—Horace Resley, Cumberland, Md.

I claim, 1st, The links or bars, A, with shouldered head and bevelled ends, and suspended by a flexible connection, so that they can rock or turn in the line of their length when they are to connect or disconnect the train, substantially as described.

2d, Also, in combination with the link or bar, A, constructed and operating as above described, the box, B, with shoulders, c c, and rounded end, j, as and for the purpose herein described and represented.

73,386.—CRUTCH.—J. C. Rhodes, Stillwater, Minn.

I claim the handle, G, in combination with the rod, A, spur, B, and the devices for projecting and retracting said spur, substantially as set forth.

73,387.—ROOFING SCAFFOLD.—Peter Richmond, Aberdeen, assignor to himself and Jacob Lamb, Aurora, Ind.

I claim the side pieces, A A, platform, B, plates, I I, and the frame, C C, or scantling, H, for forming a scaffold, the several parts being constructed and used substantially as and for the purpose set forth.

73,388.—HARVESTER RAKE.—Samuel C. Ridgaway, Baltimore, Md.

I claim, 1st, Operating a harvester rake by means of a cam of suitable form, in combination with a rotating arm and lever, or their equivalents, substantially as described.

2d, The combination of the rotating arm, a, rod, D, and rake, R, with the cam, B, when constructed and arranged to operate substantially as and for the purpose set forth.

73,389.—HARNESS PAD.—H. R. Ridgley, Mansfield, Ohio.

I claim, as an improved article of manufacture, a harness-pad and iron, constructed as described, consisting of the solid flanged iron, m, having the crupper loop cast upon and with it, and the continuous pad, d, with its upper surface, m', formed of soleleather, covering and receiving the burrs, e, as herein described, for the purpose specified.

73,390.—CONVERTABLE FORK AND HOOK.—Lyman Riggs, Lansing, Mich.

I claim, 1st, The pin, F, constructed and operating substantially as and for the purposes set forth.

2d, In combination with the shank of a fork, having notches, A B and C, the springs, D and E, constructed and operating substantially as specified.

73,391.—CHAIN INCLINOMETER.—Hermann Schussler, San Francisco, Cal.

I claim a chain inclinometer having the level, I, and scale, A A, together with the handle, III, for ascertaining the correct horizontal distance when measuring, the whole constructed and operated substantially as and for the purpose herein described.

73,392.—CULTIVATOR.—J. B. Sexton (assignor to himself and John L. Andrew), Pella, Iowa.

I claim, 1st, The adjustable iron bars, G, constructed substantially as herein shown and described, and adjustably attached to the end bars, a2, of the frame, A, as and for the purposes set forth.

2d, The beams, H, constructed substantially as herein shown and described, that is to say, curved outward at their forward ends, and strengthened at their rear ends by the cross bars, J, as and for the purpose set forth.

3d, The curved adjustable bar or yoke, L, curved edgewise, and adjustably bolted to the cross bars J, substantially as herein shown and described and for the purpose set forth.

73,393.—SEED DRILL AND ROLLER.—S. Shirley, Guilford, Ill.

I claim, 1st, The wheels, A1, with attachment, A2, in combination with frame A, when arranged as described.

2d, The frame, o, cutter, E, hopper, O, drill point, O1, rods, s s', when combined and arranged as and for the purpose explained.

3d, The roller, F, with the V-shaped projection, having a triangular section cut out, as shown, as and for the purpose explained.

73,394.—COAL BOX.—S. A. Simison (assignor to himself and Boyd D. Simison) Earlville, Ill.

I claim the hopper, B, and drawer, R, in combination with slide, C, and scuttle, G, the last two constructed and operating substantially by means as described, or other equivalent means, and the whole arranged substantially as described, forming a coal box of any desirable shape and size, for purposes herein set forth and specified.

73,395.—MOVABLE BARREL STAND.—P. J. Skinner, Oswego, N. Y.

I claim the combination of the barrel stand with the rollers, D, and upright, B, as and for the purpose specified.

73,396.—CHANGE GATE FOR RAILROAD CARS.—J. B. Slawson, New York city.

I claim, 1st, A self-closing oscillating gate, B, when arranged in the door or front wall of a railroad car, omnibus, or other public vehicle, substantially as and for the purpose herein shown and described.

2d, A self-closing gate, B, when arranged as described, and when combined with a bell, I, so that whenever the gate is opened the bell will be struck, as set forth.

3d, The arrangement of the headed pin, E, and spring, h, in combination with the oscillating, self-closing gate, B, all made and operating substantially as and for the purpose herein shown and described.

73,397.—STORE TRUCK.—A. V. Smith, San Francisco, Cal.

I claim, 1st, The roller, B, brake bar, E, brakes, C C, holder, D D, metal arm H, and springs, c c, when applied to store trucks, substantially as described, for the purpose specified.

2d, The cross bar, I, handles, a a, straps, b b, ring, b', when arranged and operated substantially as described for the purposes specified.

73,398.—DEVICE FOR RAISING CASKS AND BARRELS.—Rob't Smith, Brooklyn, N. Y.

I claim, 1st, A device for transporting barrels, casks, etc, which is made and operating substantially as herein shown and described.

2d, The wheels, B, when arranged in rows, the axles in one row not being in line with those in the other rows on the same side of the frame, A, substantially as and for the purpose herein shown and described.

3d, The frame, A, when provided with slotted upper bars, d, and blocks, g, in combination with the frame, C, and rollers, e and f, all made and operating substantially as and for the purpose herein shown and described.

4th, The device for changing the respective positions of the frames, A and C, consisting of the lever, E, connecting rod, G, cross bar, k, ears, i, and pin, n, all made, operating, and secured, substantially in the manner herein shown and described.

5th, The rollers, D D, on the frame, C, in combination with the frame, A, and rollers, B, as set forth.

73,399.—LET-OFF MECHANISM FOR LOOM.—T. S. Smith, Boston, and A. B. Ely, Newton, Mass., assignors to William F. Ely, Stratford, Conn.

We claim, 1st, The arm, J, in combination with arm, I, and whip roll, F, when J is made adjustable in I, and the parts are severally arranged, substantially as described.

2d, The whip roll, F, and arm, I, having an adjustable arm, J, in combination with the single detent lever or pawl, K k, and escapement wheel, E, when severally constructed and arranged for operation, substantially as described.

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The lever, G g, with or without adjustable fulcrum, and having an adjustable weight, L, as set forth, in combination with rocking-shaft roll, F, all arranged substantially as described.

4th, The combination of lever, G g, weight, L, arm, a, levers, F I J K, and escapement wheel, E, all arranged and operating substantially as and for the purposes set forth.

5th, The rod, o, and brake, p P, arranged in combination with and in relation to the yarn beam and whip roll, substantially as and for the purposes described.

6th, The rod, o, and brake, p P, in combination with a let-off mechanism operated by the strain of the yarn, substantially as described.

7th, The mechanism for throwing back the rod, n, or rod, o, to free the yarn beam, substantially as described.

73,400.—WATER WHEEL.—William Snodgrass, Cold Spring, Wis.

I claim the float, D, with its valves, a' and c, the scroll, B, and the segment f, with the sliding piece, g, the spring, h, and screw, l, when arranged and combined substantially as described, and for the purposes set forth.

73,401.—MECHANICAL MOVEMENT.—E. Soper, N. Y. city.

I claim a crank, when composed of the gear wheels, B and D, or their equivalents, and of the plates, C, and pin, a, all made substantially as described, and operating so that the velocity of the shaft is increased without increasing the number of revolutions of the crank.

73,402.—COMBINED CATHETER AND SYRINGE.—Dr. N. B. Sondborger, Northampton, Mass.

I claim the slide or collar on the body to a syringe, in combination with a collar in the discharge tube, when the two are connected together and arranged for operation substantially as and for the purpose described.

Also, the loops applied to the cylinder of a syringe for receiving fastening straps, substantially as described.

73,403.—HORSE HAY FORK.—Isaac C. Spear, New Wilmington, Pa.

I claim, in connection with the curved lines of a hay elevator, a locking device, consisting of arms, b c, link, d, and detaching lever, f, or its mechanical equivalent, constructed and arranged substantially as and for the purposes hereinbefore set forth.

73,404.—WASH BOARD.—Edgar M. Stevens, Boston, Mass.

I claim a corrugated wash board, when made of India-rubber mixed with fibrous material, and shaped and vulcanized in the mold, substantially as described.

73,405.—SKATE.—W. X. Stevens, Waterford, N. Y.

I claim, 1st, Forming the sole and blade of a skate from one continuous piece or sheet of metal by first slitting or cutting, and then bending the said metal sheet, substantially in the manner and for the purposes herein shown and described.

2d, A combined skate sole and blade, formed from a continuous sheet of metal as described, and corrugated or indented at the angle formed by the sole, with the blade, so as to form braces for stiffening the said parts, substantially as shown and set forth.

3d, The combination with a skate of ordinary or suitable construction, of the herein described spring clutch for grasping the boot sole, the same being pivoted to the forward part of the skate, so as to extend diagonally across the sole of the same, under the arrangement and for operation as shown and set forth.

4th, The combination with a skate of ordinary or suitable construction, having a stationary jaw or equivalent bearing for the rear of the boot heel of the pivoted catch and adjustable set screw, for holding the said boot heel to the skate under the arrangement and for operation as herein shown and set forth.

73,406.—CHECK-REIN HOOK.—F. U. Stokes, Cincinnati, Ohio.

Antedated January 2, 1868.

I claim the drop piece, C, secured to the point of the check hook, as shown at c, for the purpose of closing the check hook and preventing the rein getting out.

73,407.—ANNEALING FURNACE.—W. R. Thomas, Catasauqua, Pa.

I claim the rings, F, placed between and supporting the car wheels, and fitting snugly within the furnace, A, whereby the heat is prevented from reaching the chilled tread of the wheel, while the center is being annealed by intense heat, the whole supported upon the offset, s, in the furnace, as herein set forth for the purpose specified.

73,408.—MACHINE FOR SOFTENING LEATHER AND HIDES.—Jonathan Tidd, Woburn, Mass.

I claim, 1st, A leather softening machine, constructed and arranged to operate substantially as described for the purpose specified.

2d, The perforated bed, B, or its equivalent, and the pins, c, or their equivalents, with the yielding cross head, G, and the supporting beam, K, for the purpose and substantially as described.

3d, The shaft, H, wheels or cranks, l, pitmen k and rods m, combined with the cross head, G, in the manner and for the purpose substantially as described.

4th, The nuts, d and e, and springs, g, combined with the rods, m, and the cross head, G, for the purpose and substantially as described.

73,409.—LAMP.—Howard Tilden, Boston, Mass.

I claim, 1st, The openings, i i, in the flange, C, arranged in relation to the cap, B, in the manner and for the purposes specified.

2d, The ring, D, when provided with the sustaining wires, e e, and combined with the base, A, substantially as and to operate as set forth.

3d, The base, A, the ring, D, and the cap, B, when arranged with relation to each other substantially as described.

4th, The ring, J, arranged upon and used to lift the cap, B, by, as described and set forth.

72,410.—SAUSAGE STUFFER.—John P. Troxell, Hancock, Md.

I claim the sausage stuffing machine herein described, consisting of the hinged cylinders, C C, rack bars, H H', provided with disks, I I', situated as described, and operated by wheels, E F G G', so that while one cylinder is filling the other cylinder may be filled with meat, and prepared to fill its casing as soon as the first cylinder has done its work, and *vice versa*, substantially as described.

73,411.—MACHINE FOR SIZING HAT BODIES.—Henry Warner, Newark, N. J.

I claim, 1st, The combination of the reciprocating rocking platen or board, C, platen or board, D, and connecting rods, z y, with the crank shaft, B, as and for the purpose described.

2d, The injectors, G and H, and the distributor, w, when used in combination with the boards, C and D, substantially as shown.

3d, The expressing rollers, F, and the weights, I, when combined with the described sizing machine, in the manner and for the purpose specified.

73,412.—CRANK PLANER.—William H. Warren, Worcester, Mass.

I claim, 1st, The combination, with a crank planer or like machine, of mechanism substantially as herein described, for regulating the throw of the crank without stopping or interrupting the continuous operation of the machine, as shown and set forth.

2d, The combination, with gear, F, and face plate, E, of the tubular shaft, g, central shaft, 3, screw shaft, 8, and gears, 4 h 6, and 7, substantially as and for the purposes set forth.

3d, The combination with the shaft 2, and gear, 1, of the loose gear, 5, and pulley, 12, or its mechanical equivalent, operating substantially in the manner and for the purposes herein shown and described.

4th, The combination, with gears, 1 and 5, and pulley, 12, mounted on the shaft, 2, as described, of gears, 4 and h, and their respective shafts, arranged for operation substantially as and for the purposes herein shown and specified.

5th, The combination, with the friction pulley, 12, and beveled pin, 13, of the lever, H, and shoulder, 15, substantially as and for the purposes set forth.

73,413.—MODE OF STRAINING WOOD SAWS.—Joseph R. Webster, Boston, Mass.

I claim, in combination with a hand saw frame, the lever, i, and mechanism by which it is connected with the frame, and is operated to strain the saw blade, substantially as set forth.

73,414.—TUBE WELL.—Rollin C. Welch and Joseph B. Miller, Buffalo, N. Y.

We claim the imperforated external tube, D, connected with the perforated internal tube, A, by means of the inner collar, c, and the outer collar, b, so that the tube, D, comes in contact with an external shoulder of a conical plug, B, of the tube, A, during the operation of forming the enlarged water chamber, a, and rests upon a spring catch when the tube well is adjusted for operation, substantially in the manner and for the purpose described.

73,415.—LANTERN.—George Wheeler, Chicago, Ill.

I claim, 1st, The arrangement of the conical tube or chimney, D, with the globe of a lantern, substantially as and for the purposes specified.

2d, Also, providing said chimney, D, with one or more diaphragms, E, arranged and operating substantially as and for the purposes set forth.

3d, Also, In combination with the said chimney, D, and the openings, b b, in the lantern top, the arrangement of the perforated disk, c, in the manner and for the purposes described.

4th, Also, the arrangement of the draft openings, a b, in the lantern top, with the chimney, D, operating substantially as described.

73,416.—DESK AND SEAT.—Hiram W. White, Olney, Ill.

I claim, 1st, The folding legs, C C C' C', in combination with the notches, 1 2 3 4, and locking plates, F F, or their equivalents, as a means for adjusting desks, tables, and chairs, vertically, substantially as described.

2d, The blocks, H H, and rod, I, in combination with a desk, A C C', and chair, D C C', substantially as and for the purpose specified.

73,417.—CIDER MILL.—W. N. Whiteley, Jerome Fassler, and O. S. Kelly, Springfield, Ohio.

We claim, 1st, Constructing the grinding box in two parts, substantially as set forth, and attaching the bearings of the crushing rollers to the upper part, as and for the purpose set forth.

2d, Mounting the journals of the grinding rollers, V V, in boxes, which are attached to the lower side of the sidewise projecting flange, by screw bolts, and so that the said boxes may be slightly adjustable as to their distance from each other, as set forth and described.

3d, The construction of the press frame with the press beam, L, the stay rods, J J, the front posts, A A, the girder, B, the tie rods, H H, and the angle irons, I I, as set forth.

4th, The two ribbed crushing rollers, S S, and the two grinding rollers, V V, directly beneath them, and running at different speeds, combined and arranged in a metallic grinding box constructed in two parts, and the bearings of one set of rollers connected to one of said parts, and the bearings of the other set connected to the other of said parts.

73,418.—ANIMAL TRAP.—James P. Wigal, Henderson, Ky.

I claim, 1st, the combination of the coil spring, H, crank, G, lever catches, I and J, spiral spring, L, or its equivalent, connecting rods, E and F, and arm, D, with each other and with the wings, B and C, substantially as herein shown and deserted, and for the purpose set forth.

2d, The combination of the pivoted platform, M, arm, N, connecting rod or wire, O, elbow lever, P, and bar, R, with each other and with the lever catch, J, for the purpose of springing the trap, substantially as herein shown and described.

3d, The combination of the arm, T, and connecting rod or wire, U, with the drop gate, S, and lever catch, I, for the purpose of resetting the trap, substantially as herein shown and described.

4th, The combination of the curved arm, W, with the wing, B, and drop gate, V, substantially as herein shown and described, and for the purpose set forth.

73,419.—MANUFACTURE OF PENS.—Edwin Wiley, Brooklyn, N. Y.

I claim, in the manufacture, of pens, composed of both gold and silver and known as the Union Pen, giving the seam between the two metals an extra thickness by means of solder, or otherwise, substantially as and for the purpose described.

73,420.—WORM FENCE AND PEN.—John Will, Bryan, Ohio.

I claim, 1st, the worm fence, constructed as described, whereby pens or yards can be formed by interlocking from either side, as herein shown and described.

2d, The sections, provided with notches at one end in the under part of each board, and, at the other end, in the top part of each board, the notches in the under side of one section engaging with the upper notches of the other section, and held in position by means of the cleats upon each side of the boards, near each end, all constructed and arranged as herein set forth, for the purpose specified.

73,421.—VENEER.—John B. Wilson, New York, N. Y.

I claim the veneer produced by a corrugated or zigzag cut, substantially in the manner as described.

73,422.—PIPE COUPLING.—Lewis Wilson, Ovid, N. Y.

I claim the double convex metal ring, b, interposed between the ends of the pipes, A A, and fitted into recesses, c c, formed therein, and retained in position by external pressure, applied through screw bolts, a a, or their equivalents, substantially in the manner and for the purpose described.

73,423.—WOOD TURNING LATHE.—E. K. Wisell, Warren, O.

I claim the reciprocating and vibrating frame, H, pivoted to the adjustable rod, K, and carrying the adjustable live and dead centers, M M', arranged concentrically with the axis of the revolving cutter-head, B, and operating substantially as and for the purpose described.

73,424.—HARVESTER.—William F. Goodwin, East New Yotk, assignor to Samuel Johnston, Syracuse, N. Y.

I claim, 1st, The arrangement of pinions, H H', and the transmitting wheels on arms, F F', on and around the axle and within the drum, E, whereby the required number of revolutions is obtained, substantially as described.

2d, The spur and bevel pinions, H H' and I, mounted on the tubular sleeve or axle, and operated by means of the drum and transmitting wheels, substantially as described.

3d, The secondary arm, F', carrying the transmitting wheel gearing with the drum and secondary pinion, H', for the purpose set forth.

73,425.—CONSTRUCTING ARTESIAN WELLS.—N. W. Green, Cortland, N. Y.

The herein described process of sinking wells, where no rock is to be penetrated, viz., by driving or forcing down a rod to and into the water under ground, and withdrawing it, and inserting a tube in its place to draw the water through, substantially as herein described.

73,426.—COMBINED TROUGH AND DOUBLE RACK FOR FEEDING SHEEP, CATTLE AND HORSES.—James Douglass McBride, Mansfield, Ohio.

I claim, 1st, The box trough, A, constructed substantially as described, and provided with the rack, T, and the supplementary troughs formed by the hinged boards, B B, as and for the purpose herein set forth.

2d, The rack, composed of the bars, D D and D', and bars, E, forming a double rack, and hinged cover for the box, A, when used in combination with the said box, substantially as set forth.

3d, The graduating end bars, P P, used in combination with the bar, D', for enlarging or contracting the upper and lower racks, as and for the purpose set forth.

REISSUES.

2,830.—CAR STARTING APPARATUS.—Joseph Steger, New York city. Dated July 9, 1867.

I claim, 1st, The multiplying gear, consisting of the traction bar, T, lever or equivalent, L, pivoted pawl, R, ratchet wheel, W, spiral spring, S, and spring, P S, constructed and operating substantially as and for the purpose specified.

2d, The gearing device, consisting of the spring, P S, provided with a foot button and the pawl, R, suspended from said spring, substantially as and for the purpose set forth.

2,831.—NURSING BOTTLE.—Milo S. Burr, Boston, Mass., assignee by mesne assignment of Francis J. La Forme.

I claim my said improved nursing bottle, having its body, A, composed of glass or other suitable material, and provided with an elastic nipple, or mouth piece, f, and a flexible or pendulous tube, C, applied thereto, substantially in manner and so as to operate as and for the purpose set forth.

Also, in a nursing bottle, otherwise properly organized, the use or application of a flexible or pendulous tube, substantially as and for the purpose set forth.

Also, the application of a gravitating tip or tube, e, to the lower end of the flexible tube, C, substantially as and for the purpose set forth.

2,832.—HEATING APPARATUS.—Thomas S. Clogston, Boston, Mass. Dated Dec. 13, 1864.

I claim the application and use, for heating purposes, of one or more tubes having a corrugated or annular ribbed surface, in combination with a boiler or other suitable steam generator, and pipes for conducting the steam or hot water from said generator to the corrugated tubes, essentially as herein shown and described.

2,833.—PEGGING MACHINE.—Wm. N. Ely, Stratford, Conn., assignee of Edgar M. Stevens. Dated May 28, 1867.

I claim, 1st, The combination of a vibrating moving awl with a sliding or vertically moving, or a swinging head, substantially as described.

2d, The combination of a feeding awl, with a sliding and swinging head, or with a sliding head, or with a swinging head, substantially as described.

3d, Raising and driving the awl bar and peg driving bar, or either of them, positively and directly, by means substantially as described, in combination with a laterally moving or feeding awl.

4th, So constructing the parts that the awl bar, moving up and down perpendicularly to its carriage, shall also move laterally, substantially as and for the purposes described.

5th, In combination with the foregoing, the laterally and vertically moving peg driving bar, substantially as and for the purposes described.

6th, Constructing and arranging the knife in relation to the driver and peg tube, substantially as described.

7th, Cutting the peg from the strip, substantially as described.

2,834.—SCYTHE FASTENING.—Pinckney Frost, Springfield, Vt. Dated Jan. 11, 1853. Reissue 524, dated Feb. 9, 1858; extended seven years.

I claim the loop bolt, provided with the groove, b, and the hook or loop, e, in combination with the set-ring, also provided with a groove, b', all constructed and arranged substantially as and for the purpose set forth.

2,835.—STEAM BOILER FURNACE.—John T. Hancock, Boston, Mass. Dated March 1, 1864.

I claim the method of supplying air and steam to ignited fuel in furnaces, by commingling and then introducing them into an enclosed space under the grate bar, by means substantially as above described.

2,836.—HAND STAMP.—B. B. Hill, Chicopee, Mass. Patented November 6, 1866.

I claim, 1st, The employment of an indicator index or calendar, R R', to represent the period of time, in combination with stamp-canceling wheels, I J, arranged and operating substantially as described.

2d, Also, the wheel case, G, stud or axis pin, a, with the ribbon cylinder when made in one piece of metal, substantially as and for the purpose described.

3d, Also, the calendar wheels, R R', arranged upon the same axle with the wheels, I J, in combination with the hand stamp, arranged and operating substantially as described.

4th, Also, the bracket, H, made on or secured to the case, G, having a step, c, or its equivalent, to enter the lower end of the spindle, and orifice for the screw, e, for attaching and detaching said case to the spindle, E, substantially as and for the purpose described.

5th, Also, in a hand stamp, the employment of the flanch, K, on the chase, L, in combination with the case, G, and bed, C, for the purpose of easily and quickly attaching and detaching said chase on or off of said case.

2,837.—STRAW CUTTER.—Franklin Benjamin Hunt, Richmond, Ind. Patented January 5, 1864. Reissue 2,368, dated October 2, 1866.

I claim, 1st, The bar, x, cast in one piece, with the bearings, b b, of cutter shaft, c, and extending across from one to the other, substantially as shown.

2d, Also, connecting the feed rollers, G and H, by means of the pinions, a', b', d', and e', the pinions, b' and d', being placed on studs on the swinging plate, c', attached to the shaft, n, the pinions, d' and e', being kept in gear by the link, f, or its equivalent.

3d, Also, the swinging plate, c', connected to the shaft, n, and carrying the pinions, b' and d', substantially as and for the purpose shown and set forth.

4th, Also, mounting the upper feed roller, H, in a frame, with sling extending below the lower feed roller, and acted upon by a spring, or its equivalent, substantially as shown and for the purpose set forth.

5th, Also, the hooked slings, q q, in combination with the yielding feed roller, H, and spring, I, or its equivalent, whereby the said feed roller, H, is limited in its upward movements, as set forth.

6th, Also, the hubs or bearings, u' u', attached to the slings, q q, and surrounding the shaft, p, of the feed roller, H, said hubs moving in slots, b b, in plates, w, and relieving the shaft from friction against the plates, as set forth.

7th, Also, the guide board or plate, u, connected to and moving with the frame, t, of the upper feed roller, H, and extending downward at the back of the said roller to near a level with its axis, substantially as and for the purpose set forth.

8th, I claim the slots, v v, in the plates, w, when made eccentric with shaft, C, in combination with pinions, a, b, d, and e, said pinions connecting feed rollers, H and G, so that the adjustable roller can move up and down concentric with shaft, C, and the pinions remain in gear, substantially as set forth.

9th, Also, in combination with the bar, x, and adjustable bar, E, a revolving knife, D, with its axis placed above the plane of the adjustable cutter bar, E, to act with a slanting and shearing cut, substantially as set forth.

2,838.—STRAW CUTTER.—Franklin B. Hunt, Richmond, Ind., assignee by mesne assignments of himself. Patented December 27, 1859.

I claim, 1st, Combining in one piece the bed piece, R, upon which the adjustable bar, T, rests, and the side pieces, V V, substantially as shown and described.

2d, The adjustable bar, T, against which the knife cuts, when secured, by vertical bolts, U, to an immovable bearing within the limits of the width of the cutting knife, as shown.

3d, The plate, Y, for the purpose of covering the joint between the adjustable bar, T, against which the knife cuts, and the bed piece, R, in manner substantially as set forth.

4th, The link bearings, M, attached to the shaft, D, and carrying the feed roll, Q, in combination with the springs, W, in such manner that, as the roll rises, it shortens the operative length of the springs, and thereby gives the greatest pressure to the roll when most needed, in manner substantially as shown.

5th, Attaching the fly wheel of a feed cutter to its shaft in such manner as to constitute a yielding device between said wheel and the cutting knife, for the purpose described.

6th, Attaching the knife cylinder of a feed cutter to its shaft in manner shown, or in an equivalent way, to constitue a yielding device between the knife and other parts of the machine, for the purpose herein shown and set forth.

2,839.—FIRE ANNIHILATOR.—Chas. T. Jerome, Minneapolis, Minn. Patented July 9, 1867.

I claim, 1st. The application of a quick match, or its equivalent, which will take fire at a low temperature, to an apparatus for extinguishing fires by an injection upon the same of a gaseous or a liquid non-supporer of combustion, substantially as described.

2d, Preparing the ends of the quick matches with a composition composed of the within described ingredients mixed together in about the proportions set forth.

2,840.—CLOTHES WRINGER.—C. H. Knox, Mount Pleasant, Iowa. Patented July 2, 1867.

I claim, 1st, The double cog wheel, P, and double pinion, S, substantially as set forth.

2d, The combination of cog wheel, P, and pinion, S, with rollers, D D, substantially as and for the purpose set forth.

3d, The arrangement and combination of lever, M, hinged to box, A, roller L, rods, K, levers, I, and plate, C, arranged to operate upper roller, D, as set forth.

2,841.—MACHINE FOR MAKING DRAIN PIPE.—Bradford S. Pierce, New Bedford, Mass., and Mason R. Pierce, Woodstock, N.Y. Patented April 19, 1859. Reissue 1,897. Dated Feb. 28, 1865.

We claim, 1st, A mold consisting of a case capable of being properly secured around the material while the pipe is being molded, and of being freed from the pipe when the molding is completed, in combination with a core, and also with a core socket, having a provision for freeing the socket or pipe, or both, from the core, the whole operating substantially as set forth.

2d, A mold in which the core socket is made separate and distinct from the other parts, and so formed, and so combined with such other parts, that it is capable of being connected with them when the mold is ready for use, and of being continuously kept connected with them during the entire process of molding and finishing the pipe, substantially as and for the purposes described.

3d, The arrangement of the mixing apparatus and of the core relieving devices above the platform, which conveys the molds in the manner and for the purpose substantially as specified.

4th, The combination of the core socket with the revolving disk, which receives the core and the mold, when the disk contains a provision for enabling the socket or pipe, or both, to be freed from the core, the whole operating substantially as described.

2,842.—HOOP SKIRT.—Wm. T. Ryerson, Philadelphia, Pa. Patented Aug. 27, 1837.

I claim a skeleton skirt provided with buckles, or their equivalents, near the waist band, for adjusting the vertical tapes or connections at the sides of the skirt, to accommodate the size and shape of the hips, or vary the length of the skirt, substantially as set forth.

2,843.—WEAVING.—William Smith, New York city. Dated April 5, 1853. Extended seven years. Reissue 2,656. Dated June 18, 1867.

I claim the process herein specified of weaving consisting in the use of stationary warps in combiuation with moving warps and filling that inclose such stationary warps, substantially as set forth.

2,844.—WEAVING.—William Smith, New York city. Dated April 5, 1853. Extended seven years. Reissue 2,656. Dated June 18, 1867.

I claim the heddle, or its equivalent, for supporting the stationary central warps in combination with mechanism, substantially as set forth for performing the weaving.

2,845.—CENTRIFUGAL MACHINE FOR DRAINING SUGAR AND OTHER SUBSTANCES.—David M. Weston, Boston, Mass. Dated April 9, 1867.

I claim, 1st, In the construction of centrifugal machines for separating liquids from other substances suspending such machines at the top by flexible connections, operating substantially as described.

2d, The combination of the spindle, D, and its accessories with the socket, B, and its india-rubber bushing, C, or other equivalent spring connection to form a flexible and elastic bearing for the shaft, E, by which the cylinder may be suspended, substantially as described.

3d, The employment in a centrifugal machine of a hollow shaft and a spindle or axle on which it runs to support the cylinder or basket, substantially as described.

4th, So forming and arranging the driving pulley, F, upon the shaft, E, that it shall surround the spring-bearing, substantially in the manner and for the purpose described.

5th, The construction of the openings, I, in the bottom of the cylinder in such machines and the valve, J, for the purpose of closing the same, substantially as described.

6th, The combination of the cylinder, G, the hollow shaft, E, the driving pulley, F, the spindle, D, its elastic bushing, C, and socket, B, to form the operative part of a centrifugal machine, substantially as described.

2,846.—PRINTERS' CHASE.—Richard Yeomans, Cincinnati, Ohio. Dated October 24, 1865.

I claim the transverse notches or grooves in combination with the projecting transverse obtuse edges specifically as set forth, for the purposes designed.

DESIGNS.

2,858.—CHAIR.—Levi Heywood (assignor to Heywood, Brothers & Co.), Gardner, Mass.

2,859.—FLOOR OIL CLOTH PATTERN.—John T. Webster, New York city, assignor to Edward Harvey, Brooklyn, N. Y.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

47,753.—PLOW CASTING.—Francis F. Smith, Collinsville, Conn. Dated May 16th, 1865. Application for reissue received and filed January 2d, 1868.

I claim, as a new article of manufacture, plow plates made of scemic steel, faced with cast steel.

9,540.—OPERATING THE TREADLES OF LOOMS.—Robert M. Andrews, Stafford, Conn. Dated January 18th, 1853. Extended January 17th, 1867. Application for reissue received and filed January 8th, 1868.

I claim operating each treadle by means of a mover having two outwardly acting cam surfaces of unequal lengths combined in one piece, and producing the movements and retentions substantially as herein set forth.

I also claim such a relative form and arrangement of the treadles and the movers and cams, that the cams can be reversed upon the shaft, and thereby cause a reversal of the movements and retentions of the said treadles, substantially as herein set forth.

I also claim, in a cam loom, having upright treadles or harness levers, actuated by a single set of cam wheels arranging the fulcrum shaft of the harness levers directly over or within the vertical plane of the cam wheels, substantially as described.

54,589.—GEARING.—Metropolitan Washing Machine Company, Middlefield, Conn., assignees of S. Wand, J. F. Palmer, Auburn, N. Y. Dated May 8th, 1866. Application for reissue received and filed January 3d, 1868.

I claim, 1st, Forming upon either or both faces of a disk or circular plate, cogs or teeth, so as to project from the faces of said disk in contradistinction to forming said teeth upon a hub so as to project radially therefrom, substantially as and for the purposes herein shown and described.

2d, The combination of toothed or cog wheels of ordinary or suitable construction, when used in pairs upon the same shaft, with a plate or plates arranged upon the interior opposite or exterior opposite faces of either pair in the manner described, whereby the wheels on the one shaft shall be held in place by the plate or plates of the wheels on the other shaft, and thus prevent the lateral play of the one shaft with respect to the other as set forth.

3d, In a machine having shafts arranged to operate, at varying distances from each other as described, the combination with a circular plate or plates on one shaft of a hub upon the other shaft, under such an arrangement that when the gear wheels of the shafts have engaged to a certain extent or depth the said plate or plates and hub shall come in contact and prevent the further and undue penetration of the teeth of said gears, substantially as and for the purposes specified.

66,044.—AUTOMATIC APPARATUS FOR LIGHTING AND EXTINGUISHING GAS.—E. P. Russell and P. Tremain (assignees of E. P. Russell), Manlius, N. Y. Dated June 25th, 1867. Application for reissue received and filed January 4th, 1868.

I claim, 1st, The screws, F F', the bolts, J J', the disk, H, and the arms, H', each separately and in combination with each other, made and operated substantially as and for the purposes set forth.

2d, The combination and arrangement substantially as described, of the main spring, K, gas cock, N, and arms, H', for the purposes set forth.

3d, The step shaft, E, and thumb screw, I, each separately and in combination with the hollow shaft, F, and the hands, D D', arranged and operated substantially as and for the purposes described.

4th, I claim the springs, j j', separately and also in combination with the bolts, J J,' when made and operated as above described.

70,272.—MODE OF LIGHTING STREET GAS BURNERS.—E. P. Russell, and Porter Tremain (assignees of E. P. Russell), Manlius, N. Y. Dated Oct. 29th, 1867. Application for reissue received and filed January 4th, 1868.

I claim a small supplemental burner, A, to be kept burning constantly, and the pipe leading thereto when operating in connection with a main burner, substantially as and for the purposes set forth.

I also claim the same parts, in combination with a main pipe and burner, to be used in connection with any kind of automatic apparatus for lighting and extinguishing gas, substantially as above described.

13,197.—MACHINE FOR MITERING PRINTERS' RULES.—R. Hoe & Co. (assignees of William McDonald), New York city. Dated July 3d, 1855. Application for reissue received and filed January 6th, 1868.

I claim the combination with a movable cutter of a sector, guide, plate, a rule holding bed and adjusting mechanism, constructed and operating substantially as described and for the purposes specified.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,451.—LIGHTING, HEATING, AND COOKING APPARATUS.—Zoeth Durfee, Philadelphia, Pa. Dec. 4, 1867.

3,484.—OPERATING CHAIR FOR DENTISTS.—James B. Morrison, St. Louis, Mo. Dec. 7, 1867.

3,494.—WEIGHING APPARATUS.—Joseph A. Munn, New York city. Dec. 7, 1867.

3,500.—MACHINE FOR EXCAVATING DITCHES AND DRAINS.—Henry C. Ingraham, Tecumseh, Mich. Dec. 9, 1867.

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THE UNION IRON MILLS, Pittsburgh, Pa.—The attention of Engineers and Architects is called to our Improved Wrought-Iron Beams and Girders (Patented), in which the compound welds between the stem and flanges, which have proved so objectionable in the old mode of manufacturing, are entirely avoided, we are prepared to furnish all sizes at terms as favorable as can be obtained elsewhere. For descriptive lithograph address the UNION IRON MILLS, 5 13 Pittsburgh, Pa.

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THE PEW HAT RACK.—County Rights for Sale. Send for Circular to 5 3* E. S. BLAKE, Pittsburgh, Pa.

IMPORTANT TO MECHANICS.
WE are prepared to contract and furnish to order Cap Screws, Set Screws, and Milled Machine Screws of every description. A large assortment of the American Machine Screws constantly on hand. TUCKER & APPLETON, 4 tf 8 Union st., Boston, Mass.

FOR SALE—A Resawing Saw, of Huntington Machine Co.'s manufacture, in prime running order. Price $200. GEO. STARR, Danbury, Conn.

HARRISON'S PATENT BURR STONE MILLS.—Prices reduced 50 per cent. 20-in., $110. 30-in., $220. EDWARD HARRISON, New Haven, Conn.

NICHOLSON FILE COMPANY,
Providence, R. I., Sole Manufacturers of the
Patent Increment File.
Circulars, giving prices and explaining peculiarities of manufacture, sent on application. The best testimonials as to the merits of this File can be furnished. 5 13

PLANERS & WOOD TOOLS
As formerly, by E. C. TAINTER, successor to
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Worcester, Mass. 4 2

TO MANUFACTURERS OF TEXTILE Fabrics.—Dutcher's Patent Temples, adapted to weaving all kinds of goods; also, Thompson's Patent Oil Cans for oiling Machinery—neat and economical; also Patent Shuttle Guides, which will protect the weaver and save the owner the cost of the guides every year Furnished by E. D. & G. DRAPER. 1 6eow*] Hopedale, Mass.

FOR EVANS' PATENT CARRIAGE-Spring Machinery, inquire of W. R. PETRIE & CO., Sole Manufacturers, Westville, Conn. 3 8eow

540 MILES
OF THE
Union Pacific Railroad
Running West from Omaha
Across the Continent,
ARE NOW COMPLETED,

The Track being Laid and Trains Running Within

TEN MILES OF THE SUMMIT
OF THE ROCKY MOUNTAINS.

The remaining ten miles will be finished as soon as the weather permits the road-bed to be sufficiently packed to receive the rails. The work continues to be pushed forward in the rock cuttings on the western slope with unabated energy, and a much larger force will be employed during the current year than ever before. The prospect that the whole

GRAND LINE TO THE PACIFIC
WILL BE COMPLETED IN 1870,

was never better.

The means provided for the construction of this Great National Work are ample. The United States grants its Six Per Cent Bonds at the rate of from $16,000 to $48,000 per mile, for which it takes a *second lien* as security, and receives payment to a large if not to the full extent of its claim in services. These Bonds are issued as each twenty mile section is finished, and after it has been examined by United States Commissioners and pronounced to be in all respects a first-class road, thoroughly supplied with depots, repair shops, stations, and all the necessary rolling stock and other equipments.

The United States also makes a donation of 12,800 acres of land to the mile, which will be a source of large revenue to the Company. Much of this land in the Platte Valley is among the most fertile in the world, and other large portions are covered with heavy pine forests and abound in coal of the best quality.

The Company is also authorized to issue its own First Mortgage Bonds to an amount equal to the issue of the Government and no more. Hon. E. D. Morgan and Hon. Oakes Ames are Trustees for the Bondholders, and deliver the Bonds to the Company only as the work progresses, so that they always represent an actual and productive value.

The authorized capital of the Company is One Hundred Million Dollars, of which over five millions have been paid in upon the work already done.

EARNINGS OF THE COMPANY.

At present, the profits of the Company are derived only from its local traffic, but this is already much more than sufficient to pay the interest on all the Bonds the Company can issue, if not another mile were built. It is not doubted that when the road is completed the through traffic of the only line connecting the Atlantic and Pacific States will be large beyond precedent, and, as there will be no competition, it can always be done at profitable rates.

It will be noticed that the Union Pacific Railroad is, in fact, a *Government Work*, built under the supervision of Government officers, and, to a large extent, with Government money, and that its bonds are issued under Government direction. It is believed that no similar security is so carefully guarded, and certainly no other is based upon a larger or more valuable property. As the Company's

FIRST MORTGAGE BONDS

are offered for the present at **90 CENTS ON THE DOLLAR,** they are the cheapest security in the market, being more than 15 per cent lower than U. S. Stocks. They pay

SIX PER CENT IN GOLD,

or over **NINE PER CENT** upon the investment, and have thirty years to run before maturity. Subscriptions will be received in New York at the Company's Office, No. 20 Nassau street, and by

CONTINENTAL NATIONAL BANK, No. 7 Nassau st,
CLARK, DODGE & CO., Bankers, No. 51 Wall st.
JOHN J. CISCO & SON, Bankers, No. 33 Wall st.,

and by the Company's advertised Agents throughout the United States. Remittances should be made in drafts or other funds par in New York, and the bonds will be sent free of charge by return express. Parties subscribing through local agents will look to them for their safe delivery.

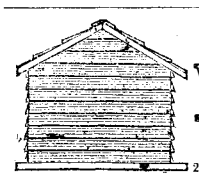
A New Pamphlet and Map, showing the Progress of the Work, Resources for Construction, and Value of Bonds, may be obtained at the Company's Offices, or of its advertised Agents, or will be sent free on application.

JOHN J. CISCO, Treasurer.

New York, Jan. 8th, 1868. 5 tf

UNRIVALLED PORTABLE FRENCH Burr Stone Mills of all sizes for grinding various kinds of grain, Coffee, Spices, Plaster and Paint. Address 4 4* S. N. PRENTISS & CO., 249 West 28th st., N. Y.

PLATINUM—For all Laboratory and Manufacturing purposes. Platinum Scrap and Ore Purchased. H. M. RAYNOR, Office 748 B'dway, N.Y. 1 eow6*



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Water Proof Roofing,
BELTING & HARNESS PAPER,
Send Stamp for Circular and Sample of the Paper.
C. J. FAY & CO.,
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"ALL MEN WHO USE PLANE IRONS."

We hereby authorize all "Hardware Dealers" to allow their customers to try our "Clover-Leaf Plane Irons," and, if not *perfectly suited*, take them back, refund price paid, and charge irons over to us.

We want Mechanics and Dealers to Run no Risk in Buying our Plane Irons.

See that our

TRADE MARK

Is on each Iron.

REYNOLDS, BARBER & CO.,
Steel Tempering Works,
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HYDRAULIC Jacks and Punches, Improved. Manufactured by E. LYON, 470 Grand st., New York. Send for a circular. 1 eow13*

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FIRST PREMIUM.....PARIS, 1867.
EXPOSITION UNIVERSELLE!
PEASE'S IMPROVED OILS!

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Awarded to **F. S. PEASE** for Improved Engine, Signal, Lard, and Premium Petroleum, as the **Best made!**

These Improved Oils cost no more than many of the common oils in market, while they are endorsed by the greatest experience and highest authority in the United States and Europe, and offered to the public upon the most thorough, reliable, and practical tests as the Best Oils made for
Railroads, Steamers, and for Machinery and Burning.
F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N B.—Reliable orders filled for any part of the world. 1 tf

AMERICAN EMERY.

ARROWSIC EMERY, Manufactured at Bath, Me. All numbers from fourup to one hundred and twenty. The only real mine in the world, excepting in Turkey. For sale in quantities to suit, at reduced prices, by J. C. BAILEY, Agent, 196 Congress st., Boston, Mass.

From Stanly Rule and Level Co., New Britain, Conn.
"We have been using some numbers of your Emery on steel, and it gives good satisfaction. If it proves to work as on trial, thus far, we shall use nothing else. For some reason, London emery does not give us good satisfaction on steel.

Bristol, Conn.:
Our men, who work by the job, say your Emery is better than any English or American Emery they ever used.

Mackintosh Hemphill Co., Pittsburgh, Pa.:
The quality of your Emery Cloth is excellent. 1 5*

WOODWORKING MACHINERY OF superior quality manufactured corner 15th st. and Pennsylvania avenue, Philadelphia, Pa. Special attention given to building Woodworth Planers from new and improved patterns. POWER & DAVIS. 2 13

LATHE CHUCKS—HORTON'S PATENT—from 4 to 36 inches. Also for car wheels. Address, E. HORTON & SON, Windsor Locks, Conn. 4 13*

BROWN'S PATENT LOW-WATER REporters, a certain preventive from the explosion of Steam Boilers by reason of low water. Warranted the most reliable and most simple low-water indicator ever offered. Sole Agents for New York State, M. T. DAVIDSON & CO., 1 11] 84 John st., New York.

P.S. PRICE LIST OF
STUBS' FILES, PLYERS, CUTting Nippers, Hand Vises, Steel Wire, etc.; Twist Drills and Chucks: Drawing Instruments, Steel Letters and Figures sent to any address.
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STENCIL DIES and materials of all kinds. Extra quality brushes at $9 per 1000. For circulars and sample brush, address E. H. PAYNE, man't, Payne's Block, cor. Church and Cherry sts., Burlington, Vt, 3 3—R

WHEATON'S OINTMENT cures the Itch
WHEATON'S OINTMENT will cure Salt Rheum.
WHEATON'S OINTMENT cures Old Sores.
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Price 50 cents;—by mail 60 cents. All Druggists sell it.
WEEKS & POTTER, Boston, Proprietors. 2 tf

WIRE ROPE.
Manufactured by
JOHN A. ROEBLING
Trenton, N. J.

FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information. 1 9*tf

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TAYLOR'S GROOVING MACHINES—Groove with and across the grain, ¼ to 1¼ inch wide. Sold only by S. C. HILLS, 12 Platt st., N. Y. 1 6*

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CHASE'S SILVER LOCK HAIR CRIMPER.—Wanted—Agents, male and female, one in every town. Profits 150 per cent. Sells at sight to every lady. Samples with directions sent by mail on receipt of 25 cents. Address O. N. CHASE, 81 Washington street, Boston, or FOWLER & WELLS, New York city.

CHASE'S DOLLAR MICROSCOPE.—Sample by mail, $1. Agents wanted. Great inducements. Perfect and complete in every part.—Scientific American, Circulars free. 4 4

Vises! Vises! Vises!

THE UNION VISE CO., of Boston, Mass., make Vises of all kinds for heavy or light work. Their Pipe Vises, with and without extra jaw, are equal to the heaviest kind of piper's work. Send for price list. For sale by dealers in hardware. 1 5*—D.

AGENTS WANTED—To sell Powell's Patent Broom and Brush Holder. Will hold any size of handle without strings; is wanted in every family. Can make $10 per day. Samples, post paid, 35c. Circulars free. Address POWELL & CO., 4 6* No. 25 South Eighth st., Philadelphia, Pa.

SLATE SLABS—Of any size for every building and manufacturing purpose. Plain, Carved, and Marbleized. HUDSON RIVER SLATE CO., 25 Park Row, N. Y. 4 4*

ALCOTT'S CONCENTRIC LATHES.—For Broom, Hoe, and Rake Handles, Chair Rounds, etc., and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, 12 Platt st., New York 1 tf a

THE
HARRISON BOILER
is the only one now offered for sale entirely FREE from
DESTRUCTIVE EXPLOSION.

Twenty thousand horse-power have been made and put in operation within the last three years, with a constantly increasing demand. For descriptive circulars and price apply to the Harrison Boiler Works, Philadelphia, Pa., or to J. B. HYDE, Agent, 1 tf] Offices 9 and 10, No. 119 Broadway, N. Y

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WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass. 2 13*] WITHERBY, RUGG & RICHARDSON.

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK, P. O. Box 1,057, Boston, Mass.
N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 2 13*

BABCOCK & WILCOX'S PATENT STATIONARY STEAM ENGINES, from 25 to 1,000 horse-power, built in the best manner and at the shortest notice by the South Brooklyn Steam Engine & Boiler Works Imlay, Summit, and Van Brunt sts., Brooklyn, N. Y. ☞ Over 4,000 horse-power of these engines are now running and contracted for. 2 tf D. McLEOD, Proprietor.

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BABCOCK & WILCOX'S PATENT STATIONARY STEAM ENGINES, Built by the Hope Iron Works, Providence, R. I. Warranted Superior to any other engine in the market, for economy of fuel, regularity of speed, and non-liability to derangement. [2 tf] JOS. P. MANTON, Agt.

TO IRON FOUNDERS.—By using the waste heat from a Cupola Furnace, connected with a Harrison Boiler, a saving of the entire cost of fuel for the blast can be guaranteed.
As thus applied, it may be seen daily in operation from 2 to 5 o'clock, p. m., at the Harrison Boiler works, Gray's Ferry Road, Philadelphia, Pa. J. B. HYDE, Agent 1 tf 119 Broadway, New York.

BARREL MACHINERY. — Greenwood's Patent Stave and Heading Machinery, for Tight and Slack Work. Geddis's Patent Barrel Heaters. G. L. Benton's Patent Convex Emery Wheels, for Gumming and Sharpening Saws. JOHN GREENWOOD, Rochester Barrel Machine Works Rochester, N. Y. 1 11*tf

WANTED—Ladies and Gentlemen everywhere, in a business that will pay $5 to $20 per day; no book, patent right, or medical humbug, but a standard article of merit, wanted by everybody, and sold at one third the usual price, with 200 per cent profit to our agents. Samples and circulars sent by mail for 25 cents. 4 tf] WHITNEY & SON, 6 Tremont st., Boston, Mass.

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RAILROAD, STEAMSHIP, MANUFACturers, and Engineer's Supplies, of all kinds, at 1 24 M. T. DAVIDSON & CO.'S, 84 John st., N. Y

STEAM and GAS FITTERS, Also, Plumber's Goods, and Tools of all kinds. Quinn's Patent Boiler Ferrule, the only Sure Remedy for a leaky Tube. Also, Steam Gages, Gage Cocks, Water Gages, safety Valves and Feed Pumps, for sale by JOHN F. C. RIDER, 47 Dey st. N. Y. Manufactory at South Newmarket, N. H 25-17

"BENEDICT'S TIME," for this Month. Timetables of all Railroad and Steamboat lines from New York, with City Map, 25c., sent by mail. BENEDICT BROS., Jewelers, 171 Broadway. BENEDICT BROS., up town, 691 Broadway. BENEDICT BROS., Brooklyn, 234 Fulton st. 1 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & CO., Lawrence, Mass. 1 tf

WROUGHT-Iron Pipe for Steam Gas and Water; Brass Globe Valves and Stop Cocks, Iron Fittings, etc. JOHN ASHCROFT, 50 John st., N. Y. 1 7*

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Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder, mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten.

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder, welche persönlich nach unserer Office kommen werden von Deutschen prompt bedient werden.

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37 Park Row, New York.

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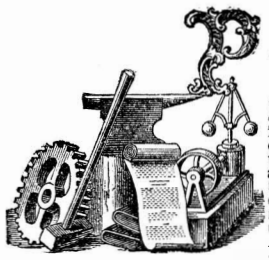
PATENTS



The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century.* Over Fifty thousands inventors have had benefit from our counsels. More than one third of all patents granted are obtained by this firm.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion.* For such consultations, opinion, and advice, *we make no charge.* A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly, do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential.* Address MUNN & CO., 37 Park Row, New York.

Preliminary Examination.—In order to obtain a Preliminary Examination, make out a written description of the invention in your own words, and a rough pencil or pen-and-ink sketch. Send these with the fee of $5 by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. The Preliminary Examination consists of a special search, which we make with great care, among the models and patents at Washington to ascertain whether the improvement presented is patentable.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Address MUNN & CO., 37 Park Row, for full particulars.

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Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

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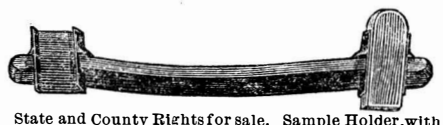

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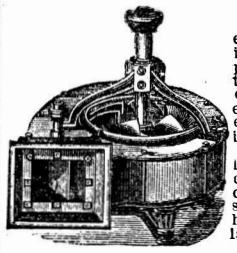

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